Vol. VII MARCH, 1921 No. 2

ENTRIES 566–1527

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense

PUBLISHED MONTHLY UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

A democratically constituted organization, with members representing many societies interested in plants.

THE SOCIETIES NOW REPRESENTED

AND

THE MEMBERS OF THE BOARD OF CONTROL

(The Executive Committee for 1921 are indicated by asterisks)

American Association for the Advancement of Science, Section G.
R. A. HARPER, Columbia University, New York City.
B. E. LIVINGSTON.

Botanical Society of America, General Section.
H. A. GLEASON, New York Botanical Garden, New York City.
*B. M. DAVIS.

Botanical Society of America, Physiology Section.
OTIS F. CURTIS, Cornell University, Ithaca, New York.
*B. M. DUGGAR, *Chairman of the Board.*

Botanical Society of America, Systematic Section.
MARSHALL A. HOWE, New York Botanical Garden, New York City.
J. A. BARNHART.

Botanical Society of America, Mycological Section.
C. H. KAUFFMAN, University of Michigan, Ann Arbor, Michigan.
BRUCE FINK, Miami University, Oxford, Ohio.

American Society of Naturalists.
H. H. BARTLETT, University of Michigan, Ann Arbor, Michigan.
*J. A. HARRIS.

Ecological Society of America.
H. L. SCHANTZ, U. S. Bureau of Plant Industry, Washington, D. C.
*FORREST SHREVE.

Paleontological Society of America.
ARTHUR HALLICK, 61 Wall Street, New Brighton, New York.
E. W. BERRY.

American Society of Agronomy.
C. B. HUTCHISON, Cornell University, Ithaca, New York.
C. A. MOOERS.

Society for Horticultural Science.
V. R. GARDNER, University of Missouri, Columbus, Missouri.
E. J. KRAUS.

American Phytopathological Society.
L. R. JONES, University of Wisconsin, Madison, Wisconsin.
*DONALD REDDICK.

Society of American Foresters.
RAPHAEL ZON, U. S. Forest Service, Washington, D. C.
J. S. ILLICK, Pennsylvania Department of Forestry, Harrisburg, Pennsylvania.

American Conference of Pharmaceutical Faculties.
HEBER W. YOUNGKEN, Philadelphia College of Pharmacy and Science, Philadelphia, Pennsylvania.
HENRY KRAEMER.

Canadian Society of Technical Agriculturists.
W. P. THOMPSON, University of Saskatchewan, Saskatoon, Saskatchewan.
B. T. DICKSON, Macdonald College, Macdonald College, Quebec.

Royal Society of Canada.
No elections.

At large.
W. A. ORTON.

WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

Entered as second-class matter, November 9, 1918, at the post office at Baltimore, Maryland, under the Act of March 3, 1879

Copyright 1921, Williams & Wilkins Company

Price, net postpaid, per volume: { $3.00, United States, Mexico, Cuba
$3.12, Canada
$3.25, Other countries

CONTENTS

Agronomy 566–684
Bibliography, Biography and History 685–710
Botanical Education 711–718
Cytology 719–739
Forest Botany and Forestry 740–838
Genetics 839–943
Horticulture 944–1047
Morphology, Anatomy and Histology of Vascular Plants 1048–1077
Morphology and Taxonomy of Bryophytes 1078–1096
Paleobotany and Evolutionary History 1097–1124
Pathology 1125–1275
Pharmaceutical Botany and Pharmacognosy 1276–1289
Physiology 1290–1385
Soil Science 1386–1420
Taxonomy of Vascular Plants 1421–1498
Miscellaneous, Unclassified Publications 1499–1527

BOARD OF EDITORS FOR 1920 AND ASSISTANT EDITORS

Editor-in-Chief, BURTON E. LIVINGSTON
The Johns Hopkins University, Baltimore

Associate, LON A. HAWKINS
U. S. Bureau of Plant Industry, Washington, D. C.

EDITORS FOR SECTIONS

Agronomy. C. V. PIPER, U. S. Bureau of Plant Industry, Washington, D. C.—Assistant Editor, MARY R. BURR, U. S. Bureau of Plant Industry, Washington, D. C.

Bibliography, Biography and History. NEIL E. STEVENS, U. S. Bureau of Plant Industry, Washington, D. C.

Botanical Education. C. STUART GAGER, Brooklyn Botanic Garden, Brooklyn, New York.—Assistant Editor, ALFRED GUNDERSEN, Brooklyn Botanic Garden, Brooklyn, New York.

Cytology. GILBERT M. SMITH, University of Wisconsin, Madison, Wisconsin.—Assistant Editor, GEO. S. BRYAN, University of Wisconsin, Madison, Wisconsin.

Ecology and Plant Geography. H. C. COWLES, The University of Chicago, Chicago, Illinois.—Assistant Editor, GEO. D. FULLER, The University of Chicago, Chicago, Illinois.

Forest Botany and Forestry. RAPHAEL ZON, U. S. Forest Service, Washington, D. C.—Assistant Editor, J. V. HOFMANN, U. S. Forest Service, Wind River Experiment Station, Stabler, Washington.

Genetics. GEORGE H. SHULL, Princeton University, Princeton, New Jersey.—Assistant Editor, J. P. Kelly, Pennsylvania State College, State College, Pennsylvania.

Horticulture. J. H. GOURLEY, West Virginia University, Morgantown, West Virginia.—Assistant Editor, H. E. KNOWLTON, West Virginia University, Morgantown, West Virginia.

Miscellaneous, Unclassified Publications. BURTON E. LIVINGSTON, The Johns Hopkins University, Baltimore, Maryland.—Assistant Editor, SAM F. TRELEASE, The Johns Hopkins University, Baltimore, Maryland.

Morphology, Anatomy and Histology of Vascular Plants. E. W. SINNOTT, Connecticut Agricultural College, Storrs, Connecticut.

Morphology and Taxonomy of Algae. E. N. TRANSEAU, Ohio State University, Columbus, Ohio.

Morphology and Taxonomy of Bryophytes. ALEXANDER W. EVANS, Yale University, New Haven, Connecticut.

Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes. H. M. FITZPATRICK, Cornell University, Ithaca, New York.—Assistant Editor, CARLOS E. CHARDON, Cornell University, Ithaca, New York.

Paleobotany and Evolutionary History. EDWARD W. BERRY, The Johns Hopkins University, Baltimore, Maryland.

Pathology. G. H. COONS, Michigan Agricultural College, East Lansing, Michigan.—Assistant Editor, C. W. BENNETT, Michigan Agricultural College, East Lansing, Michigan.

Pharmaceutical Botany and Pharmacognosy. HEBER W. YOUNGKEN, Philadelphia College of Pharmacy and Science, Philadelphia, Pennsylvania.—Assistant Editor, E. N. GATHERCOAL, 701 South Wood St., Chicago, Illinois.

Physiology. B. M. DUGGAR, Missouri Botanical Garden, St. Louis, Missouri.—Assistant Editor, CARROLL W. DODGE, Brown University, Providence, Rhode Island.

Soil Science. J. J. SKINNER, U. S. Bureau of Plant Industry, Washington, D. C.—Assistant Editor, F. M. SCHERTZ, U. S. Bureau of Plant Industry, Washington, D. C.

Taxonomy of Vascular Plants. J. M. GREENMAN, Missouri Botanical Garden, St. Louis, Missouri.—Assistant Editor, E. B. PAYSON, Missouri Botanical Garden, St. Louis, Missouri.

BIBLIOGRAPHY COMMITTEE FOR 1920

J. R. SCHRAMM, *Chairman*, Cornell University, Ithaca, New York

H. O. BUCKMAN
W. H. CHANDLER
A. J. EAMES
R. A. EMERSON
H. M. FITZPATRICK
R. HOSMER
L. KNUDSON
E. G. MONTGOMERY
D. REDDICK
L. W. SHARP
K. M. WIEGAND

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. VII MARCH, 1921 No. 2

ENTRIES 566–1527

AGRONOMY

C. V. PIPER, *Editor*
MARY R. BURR, *Assistant Editor*

566. ABEL, J. **Über den Nachweis und die Bestimmung von Weizenmehl in Gemischen mit Roggen- und Gerstenmehl.** [Determination of wheat flour in mixtures of rye and barley flour.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 44–47. 1920.

567. AMES, J. W. **How beet sugar is made.** Monthly Bull. Ohio Agric. Exp. Sta. 7^{17}: 202. 1920.

568. ANONYMOUS. **Report of seed tests for 1920.** Bull. North Carolina Dept. Agric. 41^{14}: 3–62. 1920.—Tabulation of analyses of purity and germination of 1318 samples of agricultural seeds.—*F. A. Wolf.*

569. ANONYMOUS. **Datos sobre el heno del Sudan.** [Notes on Sudan grass.] Jalisco Rural [Mexico] 3: 259. 1920.

570. ANONYMOUS. **Schedule of pea cropping dates.** Seed World. 8^{6}: 20. 1920.

571. ANONYMOUS. **La mejora de la remolacha de azucar por seleccion en Francia** [Improvement of the sugar beet by selection in France.] Informacion Agric. [Madrid]10: 358–360. 1920.

572. ANONYMOUS. **Las malas yerbas.** [Weeds.] Agric. Mexicano y Hogar 36: 108–110. 1920.

573. ANONYMOUS. **Weed control and fertilization.** Tropic. Agric. 55: 23. 1920.—Work first reported in "Facts about Sugar," Jan. 24, 1920. Experiment was planned to determine the effect of weed control and fertilization on the production of sugar cane. The results indicate that control of weeds is more essential than fertilization and that the ill effect of weeds cannot be overcome entirely by fertilization.—*R. G. Wiggans.*

574. ANONYMOUS. **Cotton growing in New South Wales.** Agric. Gaz. New South Wales. 31: 663–665. 1920.

575. ANONYMOUS. **Fertilizacion de la patata.** [Fertilization of the potato.] Informacion Agric. [Madrid] 10: 196–197. *2 fig.* 1920.

576. Anonymous. **A seleccão da semente no arroz. [Selection of seed rice.]** Bol. Agric. Nova Goa [Portuguese East India] 1: 19–22. 1919.—General directions for selecting seed rice; also notes on seed treatment with hot water, copper solutions, or a mixture of ashes and water.—*John A. Stevenson.*

577. B., W. W. **Tropical control of Australian rainfall.** [Rev. of: Quayle, E. T., in bulletin No. 15 of the Commonwealth Bureau of Meteorology.] Nature **105**: 152–153. 1920.

578. Anonymous. **History of the Danish crop guarantee.** Seed World 7^{11}: 19–20. 1920.

579. Anonymous. **Danish methods of seed production.** Seed World 7^{7}: 20–21. 1920.

580. Anonymous. **El algodon. [Cotton.]** Bol. Camara Agric. Nacion. Leon [Mexico] 7: 451–457. 1920.—A popular discussion of cotton culture in Mexico.—*John A. Stevenson.*

581. Anonymous. **Selection of canes for planting.** Australian Sugar Jour. 12: 382. 1920.—A system of growing sugar cane for seed purposes has been started at the Kairi Experiment Station, on the Atherton Tableland. This has been done in an endeavor to preserve the high quality and heavy tonnage of the Badila sugar cane, the Rose Bamboo, Meera, and other of the older varieties of cane.—*C. Rumbold.*

582. Atkinson, A., and E. W. Joseph. **Sixth annual report of the Montana Grain Inspection Laboratory.** Montana Agric. Exp. Sta. Bull. 135. *22 p., 7 fig.* 1920.—The bulletin gives the results of the seed testing and seed inspection work for the year ending June 30, 1919.—*H. E. Morris.*

583. Atkinson, Alfred, J. B. Nelson, C. N. Arnett, W. E. Joseph, and O. Tretsven. **Growing and feeding sunflowers in Montana.** Montana Agric. Exp. Sta. Bull. 131: 3–39. *4 fig.* 1919.—The bulletin presents, in the first, part a brief discussion and history of the cultivated sunflower (*Helianthus annuus*) and gives the results of tests on yields and methods of growing and feeding sunflowers, as applied to Montana. The second part of the bulletin, pages 13–29, discusses the use of sunflowers as a silage crop.—*H. E. Morris.*

584. Atkinson, E. H. **Weeds and their identification.** New Zealand Jour. Agric. 20: 299–301. *Pl. I.* 1920.—*Lantana camara* L. is described. It has been present in New Zealand for twenty-five years, but still seems to be confined to one rather small section. The fruit is reported to have made children sick, but it is not believed to be injurious to live stock.—*N. J. Giddings.*

585. Baird, W. P. **Corn experiments at the Judith Basin substation.** Montana Agric. Exp. Sta. Bull. 132: 3–24. *9 fig.* 1919.—The bulletin reports experiments in growing corn in rotation and by different tillage methods. No varieties have been found that can be depended on to mature a grain crop, but a good quality of fodder corn is produced. Yields of corn were larger than those of alfalfa, brome grass, or red clover. Yields of oats, spring wheat, and barley have in all cases been higher after corn, and have averaged about the same yields as when these crops were grown on summer-fallowed land.—*H. E. Morris.*

586. Barber, C. H. **The growth of the sugar cane. On tillering.** Internat. Sugar Journal 22: 495–498. 1920.—Tillering, the inherent branching capacity of the cane, differs a good deal according to the variety and especially the group of cane grown. There are a number of factors which limit the power of a cane variety to produce its full yield. The external influences are light available, moisture in the soil, character of the soil, and amount of manure applied. As a general rule in cultivated canes, thickness and tillering-power are inversely related. The inherent character of the groups, of course, must not be neglected. —*E. Koch.*

587. Barber, C. A. **Millets for fodder on sugar estates, I.** Internat. Sugar Jour. 22: 613–616. *1 pl.* 1920.—A description and short history of sorghum (*Andropogon Sorghum*) is given. Some of the characteristics and methods of cultivation in India are described.—*C. Rumbold.*

588. Barber, C. A. **Agricultural notes on extending the milling season.** Internat. Sugar Jour. 22: 611–612. 1920.—The author describes the methods used for lengthening the sugar-cane milling season. The use of nitrogenous fertilizers, of ratoons, and of splitting up old stools into two or three parts and replanting the pieces are discussed. Much has been done by the suitable selection of early and late varieties.—*C. Rumbold.*

589. Barber, C. H. **The growth of the sugar cane. X.** Internat. Sugar Jour. 22: 548–551. *2 pl., 4 fig.* 1920.—This article concludes and summarizes a series of ten preceding papers on the growth of the sugar cane. Other interpretations are made of the large series of measurements of the canes. With examples and diagrams, it is shown how conditions prevailing during the growing season leave their marks on the size and form of the cane and its appendages.—*E. Koch.*

590. Barfusz, J. **Von der ernte, sortierung und aufbewahrung der winterkartoffeln. [Harvesting, sorting and storing winter potatoes.]** Mitteil. Deutsch. Landw. Ges. 35: 516–517. 1920.—Directions for harvesting, sorting, and storing potatoes under different conditions. —*A. J. Pieters.*

591. Barthe, A. E. **La higuerilla. [The castor bean.]** Agric. Mexicano y Hogar 36: 118–120, 124–129, 148–150. 1920.

592. Bartlett, H. **Farmers' experiment plats. Potato experiments, 1919–20. New England district.** Agric. Gaz. New South Wales 31: 692–694. 1920.—Variety trials of potatoes are given and results from mineral fertilizers. Application of superphosphate was economically efficient.—*L. R. Waldron.*

593. Bisby, G. R., and A. G. Tolaas. **The use of Bordeaux mixture for spraying potatoes.** Minnesota Agric. Exp. Sta. Bull. 192: 1–31. *4 fig.* 1920.—See Bot. Absts. 7, Entry 1219.

594. Boving, P. A. **Valuation of farm crops.** Agric. Jour. [British Columbia] 5: 120–121, 136–137. 1920.

595. Boving, P. A. **Sunflowers for ensilage.** Agric. Jour. [British Columbia] 5: 196. 1920.

596. Brenchley, Winifred E. **Weeds of farm land.** 15 × *22 cm., 239 p., 41 fig.* Longmans, Green and Co.: London, 1920.—A discussion of the weed problem and the habits of weeds rather than a manual of the individual species. Of the thirteen chapters those on Vitality of Weed Seeds, Association with Soils, Association with Crops, Uses of Weeds, and Popular Names are of especial interest, and contain many original data from the Rothamsted Experimental Station. The volume is well, though not profusely, illustrated with line drawings. About 175 citations to literature, mostly European, are given in footnotes.—*C. V. Piper.*

597. Brown, Edgar. **What farmers should expect from seedsmen.** Seed World 8^7: 26. 1920.—In this article it is pointed out that the seedsman holds a more directly responsible relation to agriculture than any other merchant, because the farmer is fundamentally dependent upon the seed merchant for his crop seed.—*M. T. Munn.*

598. Burgess, J. L. **Farmers interest in good seed.** Seed World 7^6: 27. 1920.

599. Cardon, P. V., W. O. Whitcomb, and W. F. Day. **Seventh annual report of the Montana Grain Inspection Laboratory.** Montana Agric. Exp. Sta. Bull. 136. *32 p., 3 fig.* 1920.—The bulletin discusses methods of collecting, shipping, and grading grain samples.

Inspection fees and Montana grades for wheat, oats, and barley are given, as well as a complete copy of the Montana State Grain Inspection Law. A preliminary statement of investigational work, detailed reports of seeds tested, and a financial statement of the laboratory are included.—*H. E. Morris.*

600. Cockayne, L. **An economic investigation of the montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. 20: 337–345. *7 fig.* 1920.—A comparison is made of the flora on a heavily-grazed and an adjoining lightly-grazed pasture at an elevation of about 2000 feet. *Coriaria sarmentosa* var. and *Celmisia spectabilis* are found particularly abundant in the lightly-grazed tract. *Coriaria sarmentosa* has been reported as poisonous to sheep, but in this instance they were apparently uninjured by it. The *Celmisia* is reported as unpalatable.—*N. J. Giddings.*

601. Cockayne, L. **An economic investigation of the montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. 20: 209–217. *8 fig.* 1920.—This gives the results of an experiment to determine the relative palatibility for sheep of the native plants occurring in one of the reserves. The plants are listed and relative palatibility noted.—*N. J. Giddings.*

602. Cook, O. F. **Commercial parasitism in the cotton industry.** Nature 105: 548–549. 1920.—System of marketing does not offer sufficient inducement for production of better grades of cotton. Investigations in the United States show that best and most uniform fiber can be maintained only in communities which grow a single variety. More attention is needed to determine quality in the field.—*O. A. Stevens.*

603. Crile, Austin D. **Extirpacion del zacate Johnson. [Eradication of Johnson grass.]** Agric. Mexicano y Hogar 36: 153–156. 1920.

604. Doblas, José Herrera. **Henificación de forrajes. [Haymaking.]** Bol. Asoc. Agric. Espana 11: 348–354. 1919.—The author considers methods of storing hay, for the most part by baling, together with costs and probable returns.—*John A. Stevenson.*

605. Dominguez, Zeferino. **La semilla. [Seed.]** Bol. Camara Agriç. Nacion. Leon [Mexico] 7: 449–451. *1 fig.* 1920.—The author considers the proper care of seed-corn under Mexican conditions.—*John A. Stevenson.*

606. Downing, R. G. **Flax growing in Victoria.** Agric. Gaz. New South Wales 31: 636. 1920.

607. Dymond, J. R. **Color characteristics of red clover seed.** Seed World 7[4]: 23. 1920.—In Canada in 1916 in samples of red clover seed, the purple-colored seeds were slightly more prevalent and in practically every case weighed more per thousand seeds than the yellow-colored seeds. Germination tests showed that the yellow seeds gave a higher percentage of germination and contained more hard seeds than the purple. The green or immature seeds gave the lowest percentage of germination, but contained a surprisingly high proportion of hard or impermeable seeds. The brown seeds are shown to be low in vitality and to contain the smallest percentage of hard seeds.—*M. T. Munn.*

608. Elorduy, Samuel Torres. **Cultivo de la remolacha azucarera. [Sugar beet cultivation.]** Bol. Camara Agric. Nacion. Leon [Mexico] 7: 493–495. 1920.

609. Findlay, Hugh. **The handbook for practical farmers.** *558 p., 258 fig.* D. Appleton & Company: New York and London, 1920.—This book, edited by Prof. Hugh Findlay of Columbia University, consists in the main, of contributions from men who are actively engaged in the promotion of the subjects they discuss. Of the 558 pages, some 45 are devoted to soil management and drainage, 94 to a discussion of the chief field crops, 82 to the orchard, small fruits, and vegetables, 182 to animal husbandry, 42 to farm weeds and pests (not diseases), 96 to farm engineering, economics, and miscellaneous subjects; and the book concludes

with 20 pages giving weights, measures, and various useful rules. Under each topic the fundamental facts are given, but space prohibits considerable elaboration of the many subjects touched upon. The book contains much useful general information. The contributing authors and their subjects are: A. G. McCall (Maryland Exp. Sta.), Soil Management, Manures and Fertilizers; R. G. Weggans (Coll. Agric., Cornell Univ.), Corn, Wheat, Oats, Barley, Rye, and Rotations; F. W. Oldenburgh (Maryland State Coll. Agric.), Hay, Legumes, Forage, and Soiling Crops; J. R. Fain (Univ. Georgia), The Culture of Cotton; W. W. Garner (U. S. Dept. Agric.), Culture of Tobacco; A. G. Smith (Virginia Polytech. Inst.), Culture of the Sweet Potato; C. W. Ward (Michigan Agric. Coll.), Fertilizers for the White Potato; William C. Sanctuary (New York State School Agric.), Poultry; John McNutt, (Massachusetts Agric. Coll.), Dairy Cattle; M. W. Harper (Cornell Univ.), Horse; James R. Dice (New York State School Agric.), Hogs; R. W. Duck (Syracuse Univ.), Sheep; H. F. Baldwin (Washington, D. C.), Milk Production; R. P. Prichard (New York State Coll. Forestry), Care of the Farm Wood Lot; C. Craig, and A. LaMotte (DuPont Powder Works), The Use of Explosives on the Farm; Edgar W. Cooley (International Harvester Co.), The Care of Tools on the Farm; J. H. Hewett (New York State School of Agric.), Some of the Common Diseases of Animals and Remedies; E. F. Phillips (U. S. Dept. Agric.), Bee-Keeping on the Farm; W. T. L. Taliaferro (Maryland Agric. Coll.), Construction and Arrangement of Farm Buildings; A. P. Yerkes (Maryland Agric. Coll.), Farm Engines and Their Care; E. O. Fippin (Cornell Univ.), Drainage on the Farm; James B. Morman (Federal Farm Loan Banks), Benefits of the Federal Farm Loan System; H. T. Scovil (Univ. Illinois), Farm Records; and H. F. Miller (Gould's Manufacturing Co.), Running Water for House and Outbuildings.—*C. V. Piper.*

610. Gonzalez, J. **Instrucciones para el cultivo y tratamiento del tabaco. [Cultivation and treatment of tobacco.]** Informacion Agric. [Madrid] **10**: 290–293. 1920.

611. Graber, L. F. **Wisconsin's Grimm alfalfa experience.** Seed World 8^3: 25–26. 1920.

612. Guthrie, F. B., and G. W. Norris. **Notes on wheats entered for the Royal Agricultural Society's show. Easter, 1920.** Agric. Gaz. New South Wales **31**: 627–635. 1920.—Weights per bushel, results of milling tests, and other notes are given on about 25 varieties of wheat entered; also details of the awards.—*L. R. Waldron.*

613. Hall, Thos. D. **Glucose and starch from maize.** South African Jour. Indust. **3**: 597–605. 1920.

614. Henricksen, H. C. **The selection of seed corn in Porto Rico.** Porto Rico Agric. Exp. Sta. Circ. 18: 1–22. *6 fig.* 1920.—The importance of selecting seed corn is emphasized. Structure of a corn kernel and the variations in size, shape, and color of kernels of the principal varieties are discussed. Points to be considered in selecting desirable ears are given, together with two proposed score cards for use in Porto Rico. The ear-to-row method of maintaining selections is outlined. In conclusion a satisfactory method of preserving seed corn in Porto Rico is given.—*John A. Stevenson.*

615. Hensel, M. W. **Sweet sorghum variety demonstrations, 1919.** North Carolina Agric. Ext. Ser. Circ. 102: 3–14. 1920.—Result of tests with 9 varieties of saccharine sorghums in 5 localities within North Carolina, to determine variety best suited for making syrup.—*F. A. Wolf.*

616. Hoffman, Paul. **Flachsbau und Hausweberei, ein Mittel gegen Landflucht und Leutenot. [Flax culture and home weaving, a means against land desertion and popular want.]** Mittheil. Deutsch. Landw. Ges. **35**: 395–398. 1920.

617. Ingrason, P. A. **La alfilaria. [Alfilaria.]** Rev. Agric. [Mexico] **5**: 228–233. 1919. —Description of the plants, seeding, cultivation, harvesting, and feeding value of *Erodium cicutarium* and related species, said to be of very great value as forage crops in arid regions.—*John A. Stevenson.*

618. Juritz, Chas. F. **The prickly pear (Opuntia). Possibilities of its utilization.** South African Jour. Indust. 3[1]: 687–693. *Idem.* 3[2]: 803–814. 1920.—The possibility is discussed of utilizing the prickly pear as a useful fodder plant for stock and as an article of human diet. It is also considered as a source of potash fertilizer, of sugar and vinegar, of industrial alcohol, of oxalic acid, of oil, of a mucilaginous glaze, of sizing for textile fabrics, of fiber for paper making, of a dye or coloring matter, and as a basis for soap manufacture. From a practical standpoint not more than 7 or 8 of these seem to be deserving of serious attention.—*E. M. Doidge.*

619. Kalt, Bertram. **Der Begriff "Originalsaatgut" und seine Anwendung bei der Züchtungsanerkennung. [The conception of "original seed" and its application to recognized sorts.]** Fühlings Landw. Zeitung 68: 460–471. 1919.—A discussion of the inspection and control of pure seed production with a view to insuring the genuineness, purity, and quality of the designated seed. An explanation of what the term "original seed" shall stand for, and the use and meaning of such terms as "improved" and "pedigreed" as applied to particular strains of seeds, and the organization and means through which such inspection and certification may be carried out.—*A. T. Wiancko.*

620. Keeble, Frederick. **Intensive cultivation.** Sci. Monthly 11: 445–451. 1920.—Extracts from an address at the Cardiff Meeting of the British A. A. S.—Skilled onion growers average 5 tons to the acre. A chrysanthemum grower who turned his facilities from these to onions averaged 17 tons. The average yield of potatoes is a little over 6 tons. The army gardeners of France produced 14 tons to the acre. Consequently it may be accepted as a fact that intensive cultivation would double crops.—*L. Pace.*

621. Kelly, H. J. **Agriculture at Nyngan.** Agric. Gaz. New South Wales 31: 685–687. 1920.—Experiments have shown that wheat as a grain crop at Nyngan, 250 miles northwest of Sydney, is unsafe, but that wheat for hay, and certain other fodder crops can be grown after fallow, if light seeding is practiced.—*L. R. Waldron.*

622. Killer, J. **Die Knollenwachstumsintensitat, einer bisher wenig beachteter Faktor in der Beurteilung der Kartoffelsorten. [The rate of tuber development. a heretofore little noticed factor in judging the value of varieties of potatoes.]** Fuhlings Landw. Zeitung 68: 426–430. 1919.—Varieties of potatoes of similar time of maturity differ materially in the rate of growth at different periods. Some varieties make their most rapid growth early in the season, some in midseason, and some late in the season. These observations lead to important considerations regarding the utilization of plant-food in the soil, the influence of weather conditions at different times in the season, effect of disease attacks, and relation to marketing, and place the whole matter of potato culture in a different light than heretofore. With a knowledge of the peculiarities of varieties in these respects, it is possible to regulate plant-food supplies in the soil so as to be available when most needed, and to select varieties that in their growth intensity at different periods fit in with the different weather conditions usually prevailing at certain times in the particular locality.—*A. T. Wiancko.*

623. Kiesselbach, T. A., and Ratcliff, J. A. **Freezing injury of seed corn.** Nebraska Agric. Exp. Sta. Res. Bull. 16. *96 p. 22 fig.* 1920.—The authors discuss various theories advanced to explain the death of tissues by freezing.—Microscopic studies failed to disclose any rupturing of tissues or other cytological disturbances in corn embryos killed by freezing. It is believed that freezing of a corn embryo produces a physical or chemical change, aside from the withdrawing of water, in the protoplasmic and nuclear material of the cell, so that death ensues. The change in color of the embryo as a result of freezing would seem to indicate that a chemical change had taken place.—Control and field experiments indicate that death from freezing is directly related to the moisture content of the kernel and also to the duration of the exposure to cold. Seed corn maturing in a natural way becomes cold resistant progressively as its moisture content diminishes. Seed corn mortality increases progressively as the duration of the killing temperature is extended.—Extensive

tabular data are given, showing the correlation between degrees and duration of cold, ice formation inside the kernel, moisture content of the kernel, embryo discoloration, and loss of vitality.—Cultural practices relative to the selection and preservation of seed corn are discussed, and experimental data are presented in support of the conclusions.—*T. A. Kiesselbach.*

624. Koch, Pieter. **Cotton culture.** Jour. Dept. Agric. Union of South Africa 1: 615–622. 1920.

625. Lee, S. C. **Electrical treatment of seed.** Agric. Gaz. Canada 7: 248–249. 1920.—Further investigations on electrically treated seed as compared with untreated seed on the trial grounds of the Manitoba Agricultural College, are briefly reported. A plot of Marquis wheat sown with electrically heated seed yielded 3½ bushels more grain and 533 pounds more straw than the check. The plot showed a ranker growth and ripened more slowly. Rust affected both plots equally.—*O. W. Dynes.*

626. Lemmerman, D. **Untersuchungen über verschiedene Düngungsfragen. [Investigations concerning various fertilizing problems.]** Arbeiten der Deutsch. Landw. Ges. **297.** *198 p.* 1919.—The author reports various experiments, most of which were carried on at the Society's experimental fields in Dahlem, near Berlin. The following investigations are reported: The effect of fertilizing with nitrogen, phosphoric acid, potash, and lime, with and without stable manure on yields and on the fertilizer balance in the soil, 23 p.; Green manure studies, 25 p.; On the influence of organic substances on the nitrogen in fertilizers and in soils, 5 p.; Investigations with nitrogenous fertilizers, 48 p.; with phosphate, 17 p.; with potash, 8 p.; with lime, 9 p. There are also included meteorological tables and many pages of tabulated data.—*A. J. Pieters.*

627. Liehr, O. **Der Mohn, sein Anbau und seine Verwertung. [The culture and uses of poppy.]** Fühlings Landw. Zeitung. 68: 191–198. 1919.—A popular discussion of the culture and uses of poppy for the production of seed and its products. The yield, composition, quality, and uses of poppy oil and the by-product, poppy cake, are shown and discussed in detail.—*A. T. Wiancko.*

628. Loft, Selmar. **Determining dry matter in root crops.** Seed World 7^{10}: 21–22. 1920.—The author gives the testing methods used by Danish seed growers to secure the desired results. Dry-matter determinations are described in detail, giving the methods of drawing samples, washing, and sawing the roots, and the treatment of the final samples.—*M. T. Munn.*

629. Meek, B. C., and R. N. Makin. **Farmers' experiment plots. Potato experiments, 1919–20. Central western district and south coast.** Agric. Gaz. New South Wales 31: 621–625. 1920.—Yields are given of different varieties of potatoes with and without fertilizers. Fertilizers generally gave very favorable results.—*L. R. Waldron.*

630. Meek, B. C., and H. Bartlett. **Farmers' experiment plots. Maize experiments 1919–20. Central-western and north-west districts.** Agric. Gaz. New South Wales 31: 703–706. 1920.—Conditions generally were adverse, and the results were not of particular value. Irrigated plats yielded as high as 68 bushels per acre.—*L. R. Waldron.*

631. Mitscherlich, E. A. **Ein Beitrag zur Standweite verschiedener Kulturpflanzen. [A contribution regarding the spacing of various crops.]** Fühlings Landw. Zeitung 68: 121–129. 1919.—Results of experiments with various thicknesses of planting potatoes, mustard, bushbeans, and hemp. The largest yields were secured from stands of plants per hectare as follows: potatoes, 33,333; mustard, 10,300,000; bushbeans, 800,000; hemp, 267,000. In the case of mustard, it is stated that broadcast seeding at a somewhat thicker rate might be expected to give still larger yields.—*A. T. Wiancko.*

632. Morgan, G. W., and A. E. Seamans. **Dry farming in the plains area of Montana.** Montana Agric. Exp. Sta. Circ 89: 1–22. 1920.—The circular discusses the leading crops for the great plains—wheat, oats, barley, corn, and flax—mentioning uses and the varieties best adapted. Corn is a reliable source of fodder. Native grasses, brome grass, and alfalfa are recommended for permanent pastures, while alfalfa, brome grass, sweet clover, and small grains all make good hay; and in some sections sorghums, millets, and Sudan grass have been successfully grown.—*H. E. Morris.*

633. Mundy, H. G. **The cultivation of rice.** Rhodesia Agric. Jour. 17: 321–324. *2 fig.* 1920.

634. Mundy, H. G. **The cultivation of rice in southern Rhodesia.** Rhodesia Agric. Jour. 17: 243–246. 1920.

635. Munn, M. T. **The New York seed law and seed testing.** New York Agric. Exp. Sta. [Geneva] Bull. 476. *28 p.* 1920. Chiefly a discussion of the provisions of a recently-enacted seed law, which requires that agricultural seeds offered for sale in the state of New York shall be labeled, so as to show their purity and viability.—*F. C. Stewart.*

636. Newton, W. **Soil treatment for the Nechako Valley.** Agric. Jour. [British Columbia] 5: 202–203. 1920.

637. Newton, W. **The quality in potatoes.** Agric. Jour. [British Columbia] 5: 152. 1920.

638. Oswald, H. **Untersuchungen über die Einwirkung des Grundwasserstands auf die Bewurzelung von Wiesenpflanzen auf Moorböden. [Investigations concerning the effect of ground water level upon the root development of meadow plants on moor soils.]** Fuhlings Landw. Zeitung. 68: 321–340, 370–386. 1919.—The studies were conducted on two types of moor soil, lowland moor and highland moor. The ground water level was maintained at different heights in different pots, and a mixture of clover and grass seeds was sown. Details are given of the yields and root development of the clovers and various grasses in the pots. The root development was determined at the end of the 5th year, when it was found that in low moor soil practically half the roots were those of sword grass; this grass together with meadow fescue and orchard grass made up 81 to 98 per cent of the total root content in the various pots. The great bulk of grass roots was found in the upper 10 cm. of soil. Sword grass, orchard grass, and meadow fescue were found to have the deepest root systems; these penetrated to the water table in the deepest soil. For particulars of the proportion of roots of the different grasses and the depth to which they penetrated with water tables at varying levels, the reader is referred to the original. The article is accompanied by a long bibliography.—*A. T. Wiancko.*

639. Petersen, Federico. **Los trigos seleccionadas de la hacienda Amalucan. [Selected wheats at hacienda Amalucan.]** Rev. Agric. [Mexico] 5: 112–118. *4 fig.* 1919.—The results of tests of 3 selected wheat varieties, Flor, Maravilla I, and Maravilla II in comparison with unselected varieties are given. The tests were carried out on 36 farms, the selected varieties giving greatly increased yields as well as proving more resistant to drouth and rust (*Puccinia* spp.). Tests were also made on different soil types and with different cultivation methods.—*John A. Stevenson.*

640. Pitt, J. M. **Broom millet on the Manning.** Agric. Gaz. New South Wales 31: 637–644. *6 fig.* 1920.—Cultural and other notes are given for this crop, *Holcus Sorghum* L.—*L. R. Waldron.*

641. Pole Evans, I. B. **South African fiber plants. Ambari or Deccan Hemp: Hibiscus cannabinus, L.** Jour. Dept. Agric. Union of South Africa 1: 570–580. *6 pl.* 1920.

642. Popp, M., and R. Floss. **Das Susspressfutter als Futter für Milchvieh.** [**Sweet silage as feed for milk cows.**] Mittheil. Deutsch. Landw. Ges. **35**: 391–394. 1920.—The authors describe an experiment with a form of ensilage, the making of which is said to have been developed in Switzerland. The process is not described in detail, but the reader is referred to previous papers. In the experiments reported in this paper rowen was used from a grass meadow. One portion of the rowen was made into hay, and the other put into a silo under pressure. The feeding experiment was carried on for varying periods, using the hay and the sweet silage from the same rowen grass. Analyses showed that the fat content and the crude protein content were the same for both hay and silage. The pure protein and the digestible protein were, however, greater in the hay; while the amides increased in the silage.—The cows gave more milk from the silage than from the hay; and even after the supply of silage was exhausted, the cows that had been fed on it appeared to retain the increased milk flow. The making of sweet silage is highly recommended by the authors.—*A. J. Pieters.*

643. Pridham, J. T. **Breeding cereals at the experiment farms.** Agric. Gaz. New South Wales **31**: 697–698. 1920.—See Bot. Absts. 7, Entry 926.

644. Renson, Carlos. **Cultivo de la papa.** [**Potato cultivation.**] Bol. Camara Agric. Nacion. Leon [Mexico] **7**: 467–471. 1920.

645. Renson, Carlos. **Cultivo de la papa.** [**Potato cultivation.**] Jalisco Rural [Mexico] **2**: 147–153. 1920.

646. Reventós, Jaume. **La soja.** [**The soy bean.**] Rev. Inst. Agric. Catalan de San Isidro. **69**: 65–68, 81–85. 1920.—The author gives analyses of the beans, considers their food value, uses of the oil and commercial products derived from them.—*John A. Stevenson.*

647. Robison, W. L. **Corn by-products for swine.** Monthly Bull. Ohio Agric. Exp. Sta. 5^{9}: 247. 1920.

648. Rumsey, H. J. **Seed growing in Australia.** Seed World 8^{3}: 27–28. 1920.

649. Russell, E. J. **The nations food.** [Rev. of: Rew, R. H. **Food supplies in peace and war.** *vii + 183 p.* Longmans, Green and Co.: London, 1920.] Nature **105**: 320–321. 1920.

650. Russell, E. J. **British crop production.** Nature **105**: 176–178; 206–208. 1920.—A discussion of means of increasing production. Data of yields, cost of production, fertilizers, etc.—*O. A. Stevens.*

651. Russell, E. J. **Wheat and wheat growing.** [Rev. of: Buller, A. H. R. **Essays on wheat.** *xv + 339 p.* The Macmillan Co.: New York and London, 1919.] Nature **105**: 224–225. 1920.—Reviewer finds it a very interesting history of wheat in Canada.—*O. A. Stevens.*

652. Sanchez, A. **Algunos dates sobre el cultivo del maguey.** [**Notes on the cultivation of maguey.**] Rev. Agric. [Mexico] **5**: 227–228. 1919.—*Agave* sp.

653. Sanchez, N. **El cultivo de la papa.** [**Potato cultivation.**] Rev. Agric. [Mexico] **5**: 267–269. 1919.

654. Scott, J. M. **Forage crops in the South.** Seed World 8^{1}: 40. 1920.

655. Sheehan, B. F. **Dodder in Idaho.** Seed World 8^{5}: 26–28. 1920.—In this article the author discusses dodder as a noxious weed pest, threatening the small seed industry of Idaho. The methods of dissemination of the seed and the plant, its appearance, and methods of eradication in the field, are given, together with some notes upon the principal kinds of dodder.—*M. T. Munn.*

656. Sheehan, B. F. **Responsibility for low-quality seeds.** Seed World 7^7: 23–24. 1920.—The writer gives as reasons for the marketing of inferior seeds, mentioning as the most important, the farmers' practice of selling one another adulterated seeds, of saving screenings for seed, and of purchasing second or third-grade seed for planting. It is urged that the farmer selling seed for seeding purposes should be required to comply with the same regulations as the dealer. It is suggested that the logical method of handling seeds in interstate commerce is through the medium of national grades, which would be flexible, yet place a premium upon high grade seeds.—*M. T. Munn.*

657. Sifton, H. B. **Longevity of cereal, clover, and timothy seed.** Seed World 7^4: 26–28. 1920.

658. Stewart, F. C. **Experiments on the spacing of potato plants.** New York Agric. Exp. Sta. [Geneva] Bull. 474: 1–32. 1920.—These experiments were conducted at Geneva, New York, during 5 seasons and were devoted chiefly to a comparison of 6- by 36-inch planting with 15- by 36-inch planting. Two varieties of *Solanum tuberosum* belonging to the Rural group were used. In different seasons, the thick planting produced from 55.4 to 79.2 per cent more tubers than the thin planting, but as the tubers were of smaller average size the difference in total weight of crop was much less; *viz.*, 14.4 to 36.9 per cent. The average net yield (total yield minus "seed") of tubers weighing over one ounce was 34.7 bushels per acre. More than half of this difference (18.7 bushels) consisted of tubers over two ounces in weight.—*F. C. Stewart.*

659. Stone, A. L. **Seed legislation and the farmer.** Seed World 7^{10}: 23. 1920.—The conclusion is reached that seed laws should not favor the farmer, but should be designed only to protect him from technical phases of seed trade and commerce. The practice of exempting farmers under the seed laws is not considered desirable.—*M. T. Munn.*

660. Sudendorf, Th., and G. Gahrtz. **Beitrag zur Ermittelung des Blausäuergehaltes in Rangoonbohnen.** [**Cyanide content of lima beans.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 350–353. 1920.—The cyanide content depends on the source of the beans as well as on the method of preparation.—*H. G. Barbour.*

661. Swingle, D. B., and Grace B. Nutting. **Legume inoculation.** Montana Agric. Exp. Sta. Circ. 88. *8 p.* 1919.—The circular discusses briefly legume inoculation and its advantages. The different methods in use are described.—*H. E. Morris.*

662. Thorne, C. E. **The manufacture of sorghum syrup.** Monthly Bull. Ohio Agric. Exp. Sta. 5^7: 199. *2 pl.* July, 1920.—The article comprises a brief discussion of the essential points in handling cane and producing high grade syrup from the juice.—*R. C. Thomas.*

663. Thorne, Chas. E. **The maintenance of soil fertility in Hamilton county, Ohio.** Monthly Bull. Ohio Agric. Exp. Sta. 5^{10}: 170. 1920.—This involves a report of the benefits from fertilizers and limestone in a corn, soybean, wheat, clover rotation. A detailed comparison of certain varieties is given.—*R. C. Thomas.*

664. Thorne, Chas. E. **A crop rotation for a hog farm.** Monthly Bull. Ohio Agric. Exp. Sta. 5^5: 131. 1920.—Corn, being deficient both in protein and lime, is inadequate as a muscle and protein builder. Defective features in a corn, wheat, clover rotation are pointed out. The value of the soy bean as a feed crop, and for the production of bone, protein, and pork is discussed. Consideration is given to the relative manurial value of straw and stover.—*R. C. Thomas.*

665. Tice, C. **Certified potato-seed production.** Agric. Jour. [British Columbia] **5**: 197. 1920.

666. Tice, C. **Pitt Meadows demonstration plot.** Agric. Jour. [British Columbia] **5**: 110, 112. 1920.

667. Ure, Ruby, and Beatrice, Larson. **Single vs. double blotters in germination testing.** Seed World. 7[5]: 17. 1920.

668. Uyeda, Y. **The proximate composition of Korean hemp and ramie.** Jour. Indust. Eng. Chem. 12: 573–576. 1920.—The proximate composition of Korean hemp and ramie are given as determined by the modifications of the analytical method proposed by Dore.—*Henry Schmitz.*

669. Vogel, Prof. Dr. **Die Impffrage der Nichtleguminosen.** [**Inoculation of non-legumes.**] Mittheil. Deutsch. Landw. Ges. 35: 529–532. 1920.—The author reviews the experiments that have been made with such substances as "U" cultures, "Nitrogen kompost," "Biostickstoff," "Azogenin," "Agranit," and others, and finds them without value. However, a preparation known as "Guanol," a bacterized turf, has given good results. The same quantity of nitrogen in Guanol has produced larger yields than when used as nitrate of soda. The author states that Guanol acts through its relatively high nitrogen and potash content and its content of water soluble organic substances which stimulate soil bacteria to increased activity.—*A. J. Pieters.*

670. Waldron, C. H. **Notes on the germination of Kentucky bluegrass.** Seed World 7[6]: 22. 1920.

671. Warburg, Otto. **Ueber die Fasern liefernden Boehmeria-Arten.** [**Species of Boehmeria producing fiber.**] Notizbl. Bot. Gart. Berlin 7[68]: 1–7. 1920.—The economic species are *Boehmeria nivea* (L.) Hook. Arn, and *B. tenacissima* (Roxb.) Gaud.—*H. A. Gleason.*

672. Wenholz, H. **Sunflowers as silage.** Agric. Gaz. New South Wales 31: 721–723. 1920.—This article summarizes results secured in United States and Canada.—*L. R. Waldron.*

673. Wenholz, H. **Cuzco maize.** Agric. Gaz. New South Wales 31: 701–702. 1920.—This variety was not found adapted to New South Wales. The amount of fodder produced was not up to the standard, and it produced ripe seed with difficulty. Silk did not develop until 6 weeks after tassels appeared.—*L. R. Waldron.*

674. Whipple, O. B. **Thinning as a possible substitute for seed pieces of uniform size in potato tests.** Proc. Amer. Soc. Hort. Sci. 16: 179–181. (1919)—1920.—By thinning potatoes to a single stem, size and uniformity of size were improved. The author suggests "that variations in yields resulting from planting large and small seed pieces may be purely a matter of stand." The increased yield resulting from planting larger seed pieces may be largely due to increased number of plants per hill. Field counts showed that plots of Russet Burbank potatoes planted with 1.3-ounce seed-pieces average 2.27, 1.04-ounce seed-pieces averaged 2.22, and 1.3-ounce seed-pieces averaged 1.47 plants per hill.—*H. A. Jones.*

675. Whipple, O. B. **Correlation between depths of eyes and degeneration among potatoes.** Proc. Amer. Soc. Hort. Sci. 16: 181–183. (1919)—1920.—Results of field experiments show that there is a correlation between shallowness of potato eyes and degeneracy. The writer is convinced that there is no surer way of bringing about deterioration within these varieties inclined to degeneration than by continual selection of shallow-eyed types. The Howard Elliot, a deep-eyed, high-yielding variety was selected three years for shallowness of eyes. At end of this time 90 per cent of the plants showed degenerate tendencies.—*H. A. Jones.*

676. Willaman, J. J., R. M. West, and C. P. Bull. **Sorghum and sorghum sirup manufacture.** Minnesota Agric. Exp. Sta. Bull. 187: 1–55. *17 fig.* 1919.—The growing of sorghum, preparation for the mill and the manufacture of the sirup are discussed.—*A. C. Arny.*

677. Williams, C. B. **Report of the Division of Agronomy, North Carolina Agricultural Exp. Sta.** North Carolina Agric. Exp. Sta. Ann. Rept. 42: 21–39. 1920.—Brief summary of investigational work on soil fertility and fertilizer tests, on crop rotation and on crop improvement by breeding and selection.—*F. A. Wolf.*

678. Williams, C. G. **Wheat: varietal and cultural work.** Monthly Bull. Ohio Agric. Exp. Sta. 5[7]: 195. 1920.—Wheat tests are being conducted at fourteen different points in Ohio. Among the many varieties tested, the Gladden, Trumbull, Ohio 9920, and Portage, rank high.—*R. C. Thomas.*

679. Williams, C. B., and R. Y. Winters. **Crimson clover for North Carolina.** North Carolina Agric. Ext. Serv. Ext. Circ. 98. *7 p.* 1919.—A popular agronomic account dealing with varieties, preparation of soil, seeding, inoculation, and harvesting for hay or seed.—*F. A. Wolf.*

680. Williams, C. B., and R. Y. Winters. **Vetch for North Carolina.** North Carolina Agric. Ext. Serv. Ext. Circ. 96. *8 p.* 1919.—Popular account indicating varieties adapted to the state, method for preparation of seed bed, seeding, inoculation, and value for hay or pasture.—*F. A. Wolf.*

681. Winters, R. Y., S. W. Hill, and P. H. Kime. **Community cotton improvement in North Carolina.** North Carolina Agric. Exp. Ser. Ext. Circ. 108. *30 p. 10 fig.* 1920.—An account of tests with cotton conducted to determine the variety best adapted to each of the various localities, together with results of seed selection for the improvement of these varieties.—*F. A. Wolf.*

682. Winters, R. Y., G. M. Garren, and Bixton White. **Improved seed wheat for North Carolina.** North Carolina Ext. Agric. Serv. Ext. Circ. 106. *14 p.* 1920.—Comparative tests made near Asheville and Statesville, North Carolina, over a period of three years have shown that home-grown seed is superior to northern-grown seed. Data on the value of selection for the improvement of wheat are also included.—*F. A. Wolf.*

683. Wittmack, L. **Der wahre Wert des Schilfrohrs als Wirtschaftspflanze. [The true value of Phragmites communis as an economic plant.]** Mittheil. Deutsch. Landw. Ges. **35:** 532–533. 1920.—The young leaves dried and cut into small pieces are readily eaten by cattle. The claim has been made that the root-stocks contain 30 per cent cane sugar, but the author shows, by quoting various analyses, that this figure is much too high, even when taken as the sugar content of the dry substances.—*A. J. Pieters.*

684. Zavitz, C. A. **Systematic Experiments.** Agric. Gaz. Canada **7:** 244–246. 1920.—A brief summary is given of the 1919 results throughout Ontario in testing all classes of field crops. Comparative values of leading varieties are calculated in percentages, together with summaries of yields of straw and grain. Data on the percentage of leaf roll and mosaic in potatoes were taken. Higher yields and lower susceptibility to diseases were found in the northern-grown stock.—*O. W. Dynes.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

Neil E. Stevens, *Editor*

685. Algan, H. **Bibliographie.** [Rev. of: Huffel, G. **Économie forestière. [Forest economy.]** Tome premier, deuxième volume, deuxième edition. *461 p.* 1920.] Bull. Trimest Soc. Forest. Franche Comté et Belfort **13:** 196–202. 1920.—See Bot. Absts. 7, Entry 741.

686. Andrews, A. LeRoy. **Ingebrigt Hagen.** Bryologist **23:** 79–80. 1920.—The author condenses a biographic notice by Dr. Wille in Kgl. Norsk Vidensk. Sels. Skr., 1917, and adds a number of recollections about Dr. Hagen's views, personality, and methods of work.—*E. B. Chamberlain.*

687. Anonymous. **Geo. Stephen West, M.A., D.Sc., F.L.S.** Jour. Quekett Microsc. Club **14:** 104–105. 1919.—Obituary Notice.—*Leva B. Walker.*

688. Anonymous. **Courses on the history of science.** Nature **105**: 279. 1920.—These are just beginning to be introduced in British universities.—*O. A. Stevens.*

689. Anonymous. **[Note of death of A. P. Candolle, with brief statement of his work.]** Nature **105**: 365. 1920.—See also Bot. Absts. 6, Entry 1437.

690. Anonymous. **Prof. C. A. Timiriazeff.** Nature **105**: 430. 1920.—Announces the death of Timiriazeff, "the only Russian botanist who was at all a familiar figure in England." Author of several books on plant life. Noted for demonstration of effects of different rays of the visible spectrum on photosynthetic activity of the green leaf.—*O. A. Stevens.*

691. [B., V. H.] **Wilhelm Pfeffer.** Nature **105**: 302. 1920.—Brief note of life and work.—*O. A. Stevens.*

692. Anonymous. **Tribute to the memory of James Wilson.** Sci. Monthly **11**: 478–479. 1920.—Records a tribute to the memory of James Wilson, former U. S. secretary of Agriculture.—*L. Pace.*

693. Anonymous. **Scientific and systematic pomology.** [Rev. of: **The Journal of Pomology,** Vol. 1, No. 1 and 2. Geo. Bunyard & Co.: Maidstone, 1920.] Nature **105**: 629–630. 1920.

694. Britten, James. **Lehmann's Pugilli.** Jour. Botany **58**: 198–200. 1920.—This is an account of the *Pugillus Plantarum* by Johann Georg Christian Lehmann, 1828–1857. Ten "Pugilli" are noted: the first (1828) contained 29 species; the second (1830) included some of Douglas's Californian plants; the third to sixth had no date on the title page, but were stated to have been reprinted from *The Indies* for 1831, 1832, 1833, and 1834; the fourth and fifth have prefaces dated 1831 and 1833; the seventh and eighth are dated 1838 and 1844; the ninth and tenth were issued independently in 1851 and 1857. The third is entirely devoted to Hepaticae. The first portion of No. 6 contains *De Plantis Cycadeis praesertim Africae Australis.* No. 7 contains, besides Hepaticae, a history of the Hamburg Botanical Garden. The second part of the eighth is occupied by descriptions of Preiss's New Holland plants. No. 9 is entirely occupied by *Potentilla.* The tenth contains only hepatics.—*K. M. Wiegand.*

695. Britten, James. **John Gilbert Baker (1834–1920).** Jour. Botany **58**: 233–238. 1920.—Baker was born in Yorkshire, Jan. 13, 1834, and educated in the Friends' schools at Ackworth and York. His botanical work began while at the former school. He is pictured as a very kindly man, prone to aid the beginner, a man of keen literary sense, much interested in poetry, and a genial friend of students and workers in the Royal Gardens. His portrait appeared in Jour. Botany 1893, p. 243; *Ibid.*, 1901, frontispiece; *Ibid.*, 1907, p. 67.—*K. M. Wiegand.*

696. Chase, Virginius H. **Francis Eugene M'Donald.** Rhodora **22**: 145–146. 1920.—A short biographical sketch of the late Francis Eugene McDonald, born Feb. 23, 1860, died Jan. 30, 1920. An amateur botanist and collector. His home was in Peoria, Illinois, in which region most of his collecting was done.—*James P. Poole.*

697. Duclaux, Emile. **Pasteur: the history of a mind.** English translation by Erwin F. Smith, and Florence Hedges. *23 x 15 cm., xxxii + 363 p., 22 fig., 16 pl.* W. B. Saunders Co.: Philadelphia, 1920.—"This book is more than a critique of Pasteur. It is a contribution to the biological history of a swiftly changing time, a very striking period in the development of science."—E. F. S.—In an introduction of 32 pages, Smith presents a biographical sketch of Duclaux. The translators have supplied notations to the text throughout. In addition, an annotated list of persons mentioned in the text occupies 40 pages.—Of the plates, 2 are of Duclaux and 14 of Pasteur.—*D. Reddick.*

698. Gunther, R. T. **Tradescant's first garden catalogue, 1634.** Jour. Botany **58**: 248. 1920.—The writer has in his possession one of the few copies if not the only copy in existence

of the first catalogue of Tradescant's plants. The generally-quoted edition appeared in 1656. Seven hundred and fifty species and varieties are listed in this first edition. A catalogue of fruits occupies the last five pages.—*K. M. Wiegand.*

699. Gunther, R. T. **Walter Stonehouse (1597–1655).** Jour. Botany **58**: 170–173. 1920. —Mr. Stonehouse, the botanist, is shown to be identical with Rev. Walter Stonehouse, of Magdalen College, Oxford,—a fact not before generally known. The identity was discovered through an anonymous *Catalogus Plantarum Horti mei Darfeldiae Quibus*, etc., and passages in John Tradescant's *Musaeum Tradescantianum*. Stonehouse was a Londoner, born in 1597, and later a scholar of Wadham College, Oxford, taking his B.A. degree in 1616–17, and becoming a Fellow of Magdalen College in 1617. In 1629 he became a Bachelor of Divinity, and resigned from the college, becoming rector of Darfield. An account is given of his association with Thomas Johnson and others, and of a trip with these gentlemen to the mountains of North Wales. About 1648 he was forcibly ejected from his parish by the Parliamentary Commissioners. Stonehouse was personally acquainted with Parkinson.—*K. M. Wiegand.*

700. Hutt, W. M. **Past history of the American pomological society.** Proc. Amer. Pomol. Soc. **1917**: 1–10. 1918.—A general paper. Attention is drawn to the fact that members of the society tested the different varieties of fruits in the United States long before the organization of agricultural colleges and experiment stations. Rules of nomenclature, which are still used as standard, were passed.—A statement regarding the financial standing of the Society is included.—*E. C. Auchter.*

701. Linton, Edward Francis. **William Moyle Rogers (1835–1920).** Jour. Botany **58**: 161–164. *Portrait.* 1920.—Rogers was born at Helston, Cornwall, July 12, 1835, and was educated at Helston Grammar School, where he was later an assistant master. After a short residence in Dublin he went to South Africa as vice-principal of a college there. At about this time he was ordained to priesthood. In 1862 he returned home, and, after occupying a series of clerical positions, became vicar of Bridgerule, Devon, in 1882, from which position he retired in 1885. A detailed account is given of Rogers's very numerous contributions on botanical subjects, especially of his papers on *Rubus*, on which genus he became a specialist. These studies resulted in a *Handbook of the British Rubi* in 1900. During his later years he often assisted the clergy about Bornemouth, his home, until his death on May 26, 1920.—*K. M. Wiegand.*

702. Mattirolo, Oreste. **Pietro Andrea Saccardo—Treviso 23 Aprile 1845—Padova 12 Febraio 1920. [Commemoration of Pietro Andrea Saccardo, b. April 23, 1845 at Treviso, d. February 12, 1920, at Padua.]** Atti R. Accad. Sci. Torino **55**: 468–473. 1919–1920.—His chief works were: *Sylloge fungorum omnium hucusque cognitorum.* 22 volumes; *Prevedibili funghi futuri secondo la legge di analogia*, 1896; *Botanica in Italia; Cronologia della Flora italiana; Flora Tarvisina Renovata; Enumeraxione critica delle piante vascolari finora note nella provincia Treviso.*—*Harriet M. Libby.*

703. Mattirolo, Oreste. **Commemorazione di Saverio Belli. [Memorial to Saverio Belli.]** Atti R. Accad. Sci. Torino **55**: 8–30. 1919–1920.—Saverio Belli was director of the Botanical Gardens at Turin, professor of botany at the University of Cagliari, member of the Royal Academy of Agriculture, and of many scientific societies. His chief fields of research were in taxonomy, anatomy, and physiology and are concerned mainly with the genera, *Trifolium* and *Hieracium*. His researches in systematic botany established the reality of the species of a genus or a family as the descendants of a common genealogical tree, with phylogenetic ramifications both in time and space. In anatomy, he showed that neither endoderm nor pericycle exist in *Trifolium* and many other plants, and that therefore the theory of the stele can not have general application.—A complete bibliography of his works is given covering the studies on *Trifolium* and *Hieracium*, taxonomy of phanerogams and cryptogams, and miscellaneous works.—*Harriet M. Libby.*

704. Maxwell, Herbert. **Sir Edmund Giles Loder, Bart.** Nature **105**: 301–302. 1920.—Brief account of his life and work. In botany he was especially interested in hybridizing rhododendrons, producing *R. Loderi*, a hybrid of *R. Griffithianum* and *R. Fortunei*, generally admitted to be the best hardy hybrid yet produced in the genus.—*O. A. Stevens.*

705. Merrill, Elmer D. **Dates of publication.** Jour. Botany **58**: 200. 1920.—This is a criticism of the practice among certain publishers of omitting the date of publication from the title pages. The specific case in question is F. Manson Bailey's *Comprehension Catalogue of Queensland Plants*, the date of which the author believes was March, 1913.—*K. M. Wiegand.*

706. Montemartini, Luigi. **Pier Andrea Saccardo.** Patol. Veg. **10**: 49–50. 1920.—On February 11, 1920, P. A. Saccardo died at Padova, at the age of 74 years, after having been professor of botany ther e for 41 years.—*F. M. Blodgett.*

707. Montemartini, Luigi. **Giovanni Briosi.** Rev. Patol. Veg. **10**: 33–35. 1920.—Professor Giovanni Briosi was born in Ferrara, April 9, 1846, and died July 20, 1919. He was first director of the experiment station of agricultural chemistry at Palermo and Rome; in 1883 he became professor of botany in the Royal University of Pavia and also directed the Italian cryptogamic laboratory.—A list of his publications is given.—*F. M. Blodgett.*

708. Sinturel, E. **La forêt de Fontainebleau de 1789 à 1794. [The forest of Fontainebleau from 1789 to 1794.]** Rev. Eaux et Forêts **58**: 218–226, 255–263, 281–288. 1920.—During the first years of the French Revolution the forest of Fontainebleau, like other forests throughout France, suffered severely from depredations by the neighboring inhabitants. Attempts by both local and national authorities, including the king, to check these availed little except for a short period of comparative calm during the first half of 1790. Non-payment of salaries of forest officers resulted in a slackening of their efforts to protect the forests; and on August 15, 1792, the Legislative Assembly, in an attempt to revive their interest, passed an act providing for the payment of back salaries. It was not, however, until the establishment of the first republic that really effective steps to protect the forest were taken. In the fall of 1793 the National Convention, recognizing the forest as a public asset of great value, energetically set about its preservation. Armed forces were introduced to supplement the efforts of the regular forest officers; a proposal to increase the food supply by allowing goat grazing was rejected; trespassers were apprehended and punished; and all but comparatively minor depredations were successfully prevented.—*S. T. Dana.*

709. Smith, Annie Morrill. **Mary Farnham Miller.** Bryologist **23**: 80. 1920.—An appreciation of Miss Miller's work on behalf of the Sullivant Moss Society.—*E. B. Chamberlain.*

710. S[mith], E. F. **[Émile Duclaux, 1840–1904.]** *In* Duclaux, Emilé. **Pasteur: the history of a mind.** English translation by Erwin F. Smith and Florence Hedges. W. B. Saunders Co.: Philadelphia, 1920. Most of the 30 pages of introduction to the book is devoted to a biographical sketch of Duclaux with a translation of a part of the eulogy on Duclaux said to have been written by Roux and published in Annales de l'Institute Pasteur, May, 1904.—*D. Reddick.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*
Alfred Gundersen, *Assistant Editor*

711. Anonymous. **A university course in botany.** [Rev. of: Church, A. H. **Botanical Memoirs. No. 4. Elementary notes on structural botany.** *27 p.* **No. 5. Elementary notes on the reproduction of angiosperms.** *24 p.* Oxford University Press: London, 1919.] Nature **105**: 162. 1920.

712. Anonymous. **A college of tropical agriculture.** [Rev. of: Anonymous. **West Indies; report of the tropical agricultural college committee.** H. M. stationery office, 1920.] Nature **105**: 153–154. 1920. Outline of organization of a college of agriculture recommended to be established at Trinidad.—*O. A. Stevens.*

713. Bartlett, A. W. **Note on an improved method for demonstrating the absorption of oxygen in respiration.** New Phytol. **19**: 151–152. 1920.

714. Brierley, W. B. [Rev. of: Ellis, G. S. M. **Applied botany.** *VIII + 248 p.* Hodder and Stoughton: London, 1919.] Nature **105**: 164. 1920.—Reviewer finds many errors in this exposition of "the secrets of plant life."—*O. A. Stevens.*

715. Clute, Willard N. **Plant names and their meanings, III.** *Rosaceae.* (See Bot. Absts. 7, Entry 716.) Amer. Botanist **26**: 57–61. 1920.—As far as possible the names of the *Rosaceae* are traced to their origin.—*S. P. Nichols.*

716. Clute, Willard N. **Plant names and their meanings, IV.** *Rosaceae II.* See Bot. Absts. 6, Entry 715. Amer. Botanist **26**: 90–94. 1920.

717. T(ansley), A. G. **Elementary lecturing with the help of schedules.** [Rev. of: Church, A. H. **Elementary notes on structural botany.** Oxford Bot. Mem. No. 4. Oxford Univ. Press. 1919. **Elementary notes on the reproduction of Angiosperms.** Ibid. No. 5. 1919.] New Phytol. **19**: 44–46. 1920.—It is recommended that in teaching elementary classes an accurate and full synospsis of each lecture be given to each student before the lecture is delivered.—*I. F. Lewis.*

718. Weatherwax, Paul. **A method of teaching diffusion and osmosis in connection with biological work.** Proc. Indiana Acad. Sci. **1918**: 88–92. 1920.—The author discusses briefly the history of diffusion and osmosis and then by means of well-known experiments works out definitions. Diffusion, he says, is "the dispersal of the particles of one substance among the particles of another substance, without aid from external sources," while osmosis is "the diffusion of two fluids through a membrane that tends to be semipermeable." The student should be led to connect these processes with the structure of the cell and to realize that all the life processes of the plant that involve exchange of fluids between cell and environment depend upon the selective influence of semipermeable membranes.—*F. C. Anderson.*

CYTOLOGY

Gilbert M. Smith, *Editor*
Geo. S. Bryan, *Assistant Editor*

719. Agar, W. E. **Cytology, with special reference to the metazoan nucleus.** *XII + 224 p.* MacMillan and Co.: London, 1920. $4.00.

720. Bayliss, W. M. **The properties of colloidal systems. IV. Reversible gelation in living protoplasms.** Proc. Roy. Soc. London B, **91**: 196–201. 1920.—The author describes use of intense dark ground illumination to reveal Brownian movement of minute particles in apparently clear pseudopodia of *Amoeba*. He describes a temporary gelation of this protoplasmic sol (cessation of Brownian movement) by suitable electrical stimulation, and discusses subject in general. Plant cells, because of walls, are not so suitable for intense dark ground illumination, but *Nitella* and stamen hairs of *Tradescantia* are fairly satisfactory.—*Paul B. Sears.*

721. Doncaster, L. **An introduction to the study of cytology.** *280 p., 24 pl., 31 fig.* University Press: Cambridge, 1920. $8.50.

722. C., A. H. [Rev. of: Doncaster, L. **An introduction to the study of cytology.** *280 p., 24 pl., 31 fig.* University Press: Cambridge, 1920.] Jour. Bot. **58**: 205–206. 1920.

723. G., J. B. **British cytology.** [Rev. of: Doncaster, L. **An introduction to the study of cytology.** *XIV + 280 p., 24 pl.* University Press: Cambridge, 1920.] Nature **105**: 190–191. 1920. "Not intended as a text book though it contains a wealth of facts; but its aim is to interest the senior student by pointing out the way in which cytology is related to the great fundamental problems at the root of all biological research.—*O. A. Stevens.*

724. Carter, Nellie. **Studies on the chloroplasts of Desmids. IV.** Ann. Botany **34**: 301–319. *3 pl.* 1920.—In this the last of a series of four articles on the chloroplasts of the Desmidiaceae (See Bot. Absts. 4, Entry 166 and 6, Entry 1191) the structure of the chloroplast of *Staurastum* is taken up. In sixteen of twenty-two species discussed there is a fairly massive central axial chloroplast, typically with one pyrenoid, from which a more or less definite lobe arises opposite each angle of the cell. This lobe is forked, and very often the forking is so deep that the lobe appears as two masses or plates arising from the central axis of the chloroplast. Exceptional cases are found primarily in the larger species of the genus. Thus in *S. Ophiura* Lund. the chloroplast lobes are between and not opposite the arms of the cell, while in *S. Arctiscon* (Ehr.) Lund. there is only one projection into each arm of the cell. Owing to the greater size of the lobes and reduction of the central mass in *S. sexangulare* (Bulnh.) Lund. and *S. anatinum* Cke. & Wills, pyrenoids are not found in the central mass but in the lobes. In *S. grande* Bulnh. the chloroplasts are parietal, although in very young semi-cells there is a central mass. Another quite unusual arrangement is that found in *S. tumidum* Breb., where there are from twelve to fifteen or more chloroplasts in the form of narrow bands running through the semi-cell.—The final portion of the paper is devoted to a discussion of chloroplast division in the whole family. In the Saccodermae, division of the chloroplast starts before division of the nucleus. In the Placodermae, nuclear division is completed and the new semi-cells have begun their development before there is any indication of chloroplast division. Division in this subfamily is not by constriction but by a budding of the chloroplast into the new semi-cell until the chloroplast volume is the same in the new and old semi-cells, when there is a division at the cell isthmus. At the time when the chloroplast begins to grow into the new semi-cell the pyrenoid gives off a small bud which, soon after its separation, grows in volume until it reaches the size of the original pyrenoid. —*Gilbert M. Smith.*

725. Farr, Wanda Kirkbride. **Cell-division of the pollen-mother-cell of Cobaea scandens alba.** Bull. Torrey Bot. Club **47**: 325–337. *Pl. 14.* 1920.—A review is given of literature on cytokinesis in pollen-mother-cells with special reference to cell-plate formation and cleavage. Author reports that in *Cobaea scandens alba* furrowing was observed in formation of the tetrad, but that the cell-plate was not apparent during cytoplasmic division. —*P. A. Munz.*

726. Gates, R. R. **The structure of the nucleus.** [Rev. of: Agar, W. E. **Cytology: with special reference to the metazoan nucleus.** *XII + 224 p.* Macmillan and Co.: London, 1920.] Nature **105**: 482–483. 1920.

727. Gaudissart, P. **Réseau protoplasmique et chondriosomes dans la genèse des myofibrilles. [Protoplasmic reticulum and chondriosomes in the genesis of muscle fibers.]** La Cellule **30**: 29–43. *2 pl.* 1915–1919.—An investigation of the rôles played by (1) the reticular or alveolar protoplasmic substratum and (2) the granular elements (mitochondria) in the development of muscle fibers in the chick embryo, each element having been held to be exclusively responsible by different workers. The author concludes "that the muscle fibers arise neither exclusively from a protoplasmic reticulum, nor exclusively from mitochondria or other granular elements, but that they result from the cooperation of mitochondria with a reticular structure, different, at least at first, from the mitochondria themselves. It is the reticulum . . . . which, in orienting itself, furnishes the chief outline of the muscle fibers; but, on their part, the mitochondria, in fixing themselves on this reticulum, furnish certain substances which are incorporated in it and contribute to the development of the myofibrils." It is not true that "each myofibril is only a modified filamentous chondriosome" (Duesberg).—*L. W. Sharp.*

728. Guilliermond, A. **Sur l'origine mitochondriale des plastides à propos d'un travail de M. Mottier. [Concerning the mitochondrial origin of plastids with regard to Mottier's work.]** Ann. sci. nat. bot. **X. 1**: 225–246. *5 pl., 10 fig.* 1919.—Author considers as inexact Mottier's view based upon a study of meristematic cells in pea, that mitochondrial elements and "plastid primordia" are distinct and independent entities in cytoplasm. An *a priori* objection to Mottier's theory is that in animals mitochondria appear to be concerned in elaboration of products of secretion of cell, acting similarly to plastids; and, moreover, a majority of animal pigments originate in mitochondria. Author then points out that size is no reliable criterion for distinguishing mitochondria and "plastid primordia" as Mottier argues. Mitochondria vary in size, and he has observed such cytoplasmic bodies in animals of similar size to those in plants that are "plastid primordia." In general, author considers that diverse forms of mitochondria have a common origin and, in particular, plastids have a mitochondrial origin.—*J. P. Kelly.*

729. Guilliermond, A. **Observations vitales sur le chondriome d'une Saprolegnicacée. [Observations of chondriosomes in a living Saprolegnia.]** Compt. Rend. Acad. Sci. Paris **170**: 1329–1333. *5 fig.* 1920.—Granules, rods, and filaments are made visible in the living material by staining with neutral red and cresyl blue. The latter differentiates the metachromatic bodies from the chondriosomes.—*C. H. Farr.*

730. Hartmann, Max. **Untersuchungen über die Morphologie und Physiologie des Formwechsels (Entwicklung, Fortpflanzung, Befruchtung und Vererbung) der Phytomonadinen (Volvocales). Programm der Untersuchungen und I. Mitt.: Über die Kern- und Zellteilung von Chlorogonium elongatum Dangeard. [Investigations on the morphology and physiology of variation in form (development, reproduction, fertilization, and heredity) of the Phytomonadineae (Volvocales). Program of the investigation and first contribution; On the nuclear and cell division of Chlorogonium elongatum Dangeard.]** Arch. Protistenk. **39**: 1–33. *3 pl., 2 fig.* 1919.—After a short prospectus of a proposed series of investigations on the morphology and physiology of the Phytomonadineae, the author proceeds to a description of cell and nuclear division in *Chlorogonium elongatum* Dang. The first indication of cell division is

the disappearance of the pyrenoid, while at the same time the nuclei enter the prophases of division. After the nuclear division is completed, cytokinesis takes place at right angles to the long axis of the cell. The two daughter cells grow in length, and then the nucleus of each divides again, the long axis of the spindles generally lying parallel to the recent line of cleavage. This nuclear division is followed by cell division in each of the daughter cells. Hartmann emphasizes the unusual behavior of the pyrenoid during this process, since in *C. elongatum* it completely disappears during division and is then formed anew in the daughter cells. In other Volvocales, on the other hand, there is a division of the pyrenoid. The resting nucleus contains 10–20 small granules that fuse to form ten larger granules which are the chromosomes. This fusion of granules is not in the nature of a reduction division. The origin of the spindle is intranuclear, and it frequently has but one pole in early stages. Nuclear history from the metaphase onward is of the usual type.—*Gilbert M. Smith.*

731. Herlant, M. **Le cycle de la vie cellulaire. Recherches physiologiques sur la division de la cellule. (Note preliminaire.)** [**The cycle of cellular life. Physiological researches on the division of the cell. (Preliminary note.)**] Ann. et Bull. Soc. roy. Sc. med. et nat. Bruxelles **4**: 112–117. 1920.—The author has sought to determine whether the permeability of the cortical layer of the protoplasm is constant during the entire duration of the cellular cycle. He has observed that the plasma membrane of the egg of the sea urchin is, according to the stage of the cell life, sometimes permeable and sometimes impermeable to salts. The lipoid state (semipermeable) and the albuminoid state (permeable) of the plasma membrane do not co-exist, but succeed each other periodically in the course of the cellular life. The physico-chemical equilibrium of the protoplasm, and not alone that of the cortical layer, depends in part on factors destroyed by the insoluble substances in the lipoids (permeable phase) and in part on factors destroyed by the solvents of the lipoids (semipermeable phase). These phenomena are in accordance with the emulsion theory of protoplasm.—*Henri Micheels.*

732. Kowalski, J. **Cinèses atypiqes dans les cellules adiposes de larves de Pyrrhocoris apterus L. avec quelques remarques sur le centrosome. [Atypical mitoses in the adipose cells of the larvae of Pyrrhocoris apterus L. with some remarks on the centrosome.]** La Cellule **30**: 83–119. *2 pl.* 1915–1919.—Author describes and figures a considerable variety of abnormal mitotic phenomena observed in the adipose cells of the larva of Pyrrchocoris. The abnormalities are of two main types: asymmetrical bipolar figures and multipolar figures. These result in irregular distributions of the chromatin to the daughter cells, the frequent loss of chromosomes in the cytoplasm, unequal cell division, and the formation of hypo- and hyperchromatic cells. Such aberrant behavior is apparently due to two causes—the asymmetrical bipolar figures, to the mechanical action of the numerous large fat vacuoles; and the multipolar ones, to the disturbing action of a toxin secreted by bacteria which infect the larvae. Cells showing the abnormal phenomena do not return to the embryonic state or divide normally.—The normal resting adipose cell has large fat vacuoles, comparatively scanty cytoplasm, and from 1 to 4 nuclei. The nuclear reticulum stains very faintly. From 7 to 9 (sometimes more) chromatic nucleoli are present; the total amount of nucleolar material is about constant in all the nuclei. The chromosomes number 24—16 of them are rod-shaped and 8 are small and spherical. The latter are difficult to distinguish from the nucleoli, which appear to contribute to the formation of the chromosomes.—A number of observations on normal and abnormal mitotic phenomena in these cells lead to the following conclusions regarding the centrosome and achromatic figure: The formation of the spindle accompanying the development of the chromosomes is the manifestation of a universal and fundamental condition present in all plant and animal cells dividing mitotically; namely an intense and polarized metabolic interchange between chromatin and cytoplasm, showing itself in the bipolarized arrangement of the fibers of the cytoplasmic reticulum. There are two similar opposed cones of fibers because the metaphase chromosomes are split into two equal masses with equal metabolic actions on the cytoplasm; when the chromatic masses are unequal the cones are unequal, and if for any reason they are more than two in number, the figure

has more than two poles. The spindle figure is the visible morphological expression of invisible currents of exchange passing between chromosomes and cytoplasm. The aster is a similar expression of a metabolic current in the opposite direction, from the cytoplasm toward the chromatic mass. The two currents meet at the poles of the cell, which are therefore regions of relative calm. If exchanges between chromosomes and cytoplasm cause a deposition of a visible chemical substance, it accumulates at these regions; such deposits are the centrosomes. If more material is deposited than is used by the cell during division, the centrosome is a permanent organ; otherwise it is not. The centrosome is thus neither exclusively cytoplasmic nor exclusively nuclear in origin, but comes from both as a precipitation of substances resulting from the metabolic exchange between the two. Chemical reactions, manifesting themselves in centrifugal currents of exchange between centrosome and cytoplasm, cause the appearance of the attraction sphere. When the chromatic mass divides, a second current of exchange is set up toward the centrosome, and a second centrosome is deposited near the first; the assumption of centrosome division is not necessary to account for the two. The formation of centrosomes seems to be conditioned by the size of the spindle cone, the cone in turn being proportional to the chromatic mass under whose influence it arises. The size of the centrosome is often observed to be proportional to that of the chromatic mass. The disposition and orientation of the chromatic masses determines the orientation of the spindle, and the location and size of the centrosome.—Attention is called to the relationship between centrosome and nucleolus. In some lower organisms a single "nucleolocentrosome" performs the functions of both, whereas by a division of labor two separate organs have become differentiated in most organisms.—*L. W. Sharp.*

733. Ladreyt, F. **La Cellule complexe symbiotique. [The symbiotic cell complex.]** Compt. Rend. Acad. Sci. Paris. **169**: 665–667. 1919.—From a review of his own work and that of others, the author concludes that the cell complex consists of various elements—the cytoplasm, nucleus, chondriosomes, etc.—which bear a symbiotic relation to one another and derive benefit from one another.—*V. H. Young.*

734. Meyer, Arthur. **Morphologische und Physiologische Analyse der Zelle der Pflanzen und Tiere. [Morphological and physiological analysis of the cell of plants and animals.]** *XX + 629 p., 205 fig.* Gustav Fischer: Jena, 1920. (38 marks.)

735. Rhumbler, L. **Otto Bütschlis Wabentheorie. [Otto Bütschli's alveolar theory.]** Naturwissenschaften **8**: 549–555. 1920.

736. Spek, Josef. **Über Bütschlis Erklärung der karyokinetischen Figur. [On Bütschli's explanation of the karyokinetic figure.]** Naturwissesnchaften **8**: 561–562. 1920.

737. Spek, Josef. **Ueber physikalisch-chemische Erklaerungen der Veraenderungen der Kernsubstanz. [Concerning physico-chemical explanations of the changes of the nuclear substance.]** Arch. Entwicklungsmech. **46**: 537–546. 1920. This is mainly, though not exclusively, a discussion of Paolo Della Valle's work entitled "La morfologia della cromatina dal punto di vista fiscico" (Arch. Zool. Ital. **6**: 37–321. 1912.) The general nature of the nuclear substances, the number and size of chromosomes, susceptibility of chromosomes to stains, division of chromosomes, individuality of chromosomes, and other similar subjects are briefly considered by the author.—*John H. Schaffner.*

738. Van Hoof, L. **La spermatogénèse dans les mammifères. III. Les spermatocytes leptotènes et amphitènes dans le Taureau. [Spermatogenesis in the mammals. III. The leptotene and amphitene spermatocytes in the bull.]** La Cellule **30**: 7–25 *1 pl.* 1915–1919.—Author reëxamines the "quaternary granulations" described by Schoenfeld (1901) in the nuclei of the spermatocytes of the bull and finds them to be merely the symmetrically arranged thickenings of the amphitene threads. In the nuclei of the spermatogonia and spermatocytes the chromatin takes the form of irregular blocks with a few thin strands. In the heterotypic prophase the leptotene threads develop at the expense of these blocks, vestiges of which may

remain visible for some time, and soon take on a more or less definite polar orientation. Lateral pairing of the threads begins at their free ends and gradually involves all parts. The granules or thickenings of the associating threads show a correspondence in position, which gives them the appearance not only of tetrads such as Schoenfeld thought to be of peculiar significance here, but also of dyads, hexads, and octads. As the threads pass into the pachynema stage these thickenings gradually become less conspicuous. The interpretation of Schoenfeld is attributed in large part to faulty fixation.—*L. W. Sharp.*

739. Yamaha, Gihei. **Einige Beobachtungen uber die Zellteilung in den Archesporen und Sporenmutterzellen von Psilotum triquetrum Sw. mit besonderer Rucksicht auf die Zellplattenbildung. [Some remarks on the cell division in the archesporial and spore mother cells of Psilotum triquetrum Sw. with special regard to the formation of the cell plate.]** Bot. Mag. Tokyo **34**: 117–129. *20 fig.* 1920.—The cells of Psilotum are specially adapted for cytological work because of the large nuclei, that are rich in chromatin. The rod-shaped elements of the cell plate are very persistent. In the heterotypic division of the archespore the so-called nucleolar substance could be traced near the daughter nuclei. The phragmoplast can be traced back to the chromosome-connecting filaments. These filaments divide longitudinally, starting at the equatorial plane. At this stage a large number of "extranucleoli" were observed. The daughter nuclei approach each other more or less; the cell plate becomes more conspicuous; while its granular contents, the dermatosomes, are very clear. In the meiosis no "radial fibres" were observed. The dermatosomes seem to be used up in the formation of the cell plate, which precedes the simultaneous formation of the cell wall. The homeotypic division shows the same peculiarities. The shrinkage of the wall of the spore mother cell seems to cause the separation of the tetrads.—*L. G. Baas-Becking.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*
J. V. Hofmann, *Assistant Editor*

740. Adamson, R. W. **The Bartram oak.** Sci. Amer. **122**: 301. 1920.—See Bot. Absts. 6, Entry 1564.

741. Algan, H. **Bibliographie.** [Rev. of: Huffel, G. **Économie forestiére. (Forest economy.)** Tome premier, deuxième volume, deuxième edition. *461 p.* 1920.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 196–202. 1920.—Nearly two-thirds of this important work is devoted to a discussion of the history of forest property and forest legislation from the beginning of the feudal period to the middle of the nineteenth century. Forest policy is discussed at some length, including the relation of forests to the public welfare, public control of private cuttings, public assistance to private owners, forest taxation, etc. The final part of the volume contains a wealth of statistics as to the extent, distribution, and ownership of French forests.—*S. T. Dana.*

742. Andrews, F. M. **Some trees of Indiana.** Proc. Indiana Acad. Sci. **1918**: 261–263. 1920.

743. Anonymous. **The forestry commission.** Nature **105**: 215–216. 1920.—Outline of program for 1919–20 with personnel of consultative committees for England, Scotland, Wales, and Ireland. About 34,000 acres of afforestable land are being acquired.—*O. A. Stevens.*

744. Anonymous. **Forestry, tree diseases and timber.** [Rev. of: (1) Boerker, R. H. D. **Our national forests. A short popular account of the work of the United States forest service on the national forests.** *XIV + 238 p.* Macmillan and Co.: London and New York, 1918. (2) Stebbing, E. P. **Commercial forestry in Britain: its decline and revival.** *VI + 186 p.* John Murray: London, 1919. (3) Webster, A. D. **National afforestation,** *160 p.* T. Fisher Unwin: London, 1919.] Nature **105**: 577–579. 1920.

745. Anonymous. **Forestry, tree diseases and timber.** [Rev. of: Davies, J. H. **A map of the world (on Mercator's projection), having special reference to forest regions and the geographical distribution of timber trees. Timber map, No. 1. North America, timber map, No. 2. South America, timber map, No. 3. Europe and Africa, timber map, No. 4.** Each on rollers 40 x 30 in. W. and A. K. Johnston: Edinburgh. Macmillan and Co.: London. No date.] Nature **105**: 579. 1920.—Distribution of a number is incorrect, and names are erroneous or confusing. European larch does not occur, as shown, in the Pyrenees, Apennines, Serbia, Bulgaria, etc. *Larix dahurica* should be *L. sibirica*. *L. leptolepis* is represented on Hokkaido where there is no larch, and in Manchuria and Korea where the finest *L. dahurica* grows.—*O. A. Stevens.*

746. Anonymous. **Forestry, tree diseases and timber.** [Rev. of: Rankin, W. H. **Manual of tree diseases.** *XX + 398 p.* Macmillan and Co.: New York and London, 1918.] Nature **105**: 579. 1920.—See Bot. Absts. 7, Entry 1168.

747. Anonymous. [German rev. of: Reuss. **37-jährige Fichtenreinzuchtversuche in Österreich. (37-year experiment in pure breeding of pine trees in Austria.)** Centralbl. Gesammte Forstw. **1916**: 383–417. 1916.] Zeitschr. Pflanzenzücht. **6**: 194. Dec., 1918.—See Bot. Absts. 6, Entry 1607.

748. Anonymous. [German rev. of: Urban, J. **Über die Grösse der Stecklinge. (On the size of cuttings.)** Zeitscht. Zuckerindust. Böhmen **42**: 521–526. 1918.] Zeitschr. Pflanzenzücht. **6**: 195–196. Dec., 1918.—See Bot. Absts. 6, Entry 1612.

749. Anonymous. **El mezquite. [Mesquite.]** Agric. Mexicano y Hogar **36**: 105–108. 1920.—Translated and adapted from the Scientific American.

750. Anonymous. **Le pin sylvestre. [The Scotch pine.]** Rev. Eaux et Forêts **58**: 161–162. 1920.—Artificial reforestation of Scotch pine can be largely or perhaps wholly avoided by the clear cutting of long narrow strips, lying at right angles to the direction of the prevailing winds. For example, a stand with a rotation of 60 years might be divided into six groups, arranged in two tiers and each containing ten cutting areas or strips. The first year the strip in Group 1 lying farthest from the source of the prevailing winds would be cut; the next year the similarly situated strip in Group 2; and so on. Six years would thus elapse between the cutting of adjacent strips in the same group. This should be ample to allow for natural regeneration, which could be still further assured by leaving along roads and the edges of the strips a few seed trees to hold over a second rotation. The system is flexible and can be easily adapted to different rotations and to biennial and triennial cuttings, etc.—*S. T. Dana.*

751. Anonymous. **Résultats des expériences faites, le 9 juin 1920, dans la forêt domaniale de Lamotte-Beuvron (Loir-et-Cher). [Results of experiments in the state forest of Lamotte-Beuvron.]** Rev. Eaux et Forêts **58**: 268–271. 1920.—Stumps can be extracted by the use of explosives at a net cost of about 1.5 francs per stump. The method can be used to advantage for the removal of a limited number of stumps, but is too slow and expensive for the clearing of large areas. The latter can be cleared more cheaply (net cost about 75 francs per stump), and satisfactorily by the use of caterpillar tractors, which might also apparently be used to advantage for the felling of standing timber. Holes for the planting of large trees, especially fruit trees, can be prepared by the use of explosive cartridges containing small amounts of mineral fertilizer.—*S. T. Dana.*

752. Anonymous. **The fruiting of the Ginkgo at Kew.** Kew Bull. Misc. Inf. [London] **1920**: 47–48. *1 fig.* 1920.—See Bot. Absts. 6, Entry 1839.

753. Anonymous. **Beschädigungen an Eichen durch Diaporta taleola Tul. [Injury to oak by Diaporta taleola Tul.]** Schweiz. Zeitschr. Forstw. **69**: 62–63. *Frontispiece.* 1918.—See Bot. Absts. 6, Entry 1932.

754. Aubert, C.-G. **La conversion des taillis en futaie dans l'ouest de la France. [Conversion of coppice into high forest in western France.]** Rev. Eaux et Forêts **58**: 124–132, 153–160, 189–194, 227–234. 1920.—The value of the high forest, long advocated by the leading French foresters as the forest *par excellence*, was conclusively demonstrated by the recent war, during which it was primarily the high forests under state ownership that supplied the enormous quantity and wide variety of forest products required by France and its allies. For both public and private owners the high forest is superior to coppice in the quantity, quality, and variety of its products, in its proportionately smaller cost of protection and greater production, and in its flexibility of management, which is particularly valuable in times of economic stress. The objection that it yields too low a rate of interest has lost much of its force in these days when timber prices are so high and most other investments so insecure. Some sacrifice of annual revenue is involved during the period of conversion, but this is purely temporary, can be minimized by proper handling, and really consists of an addition to the forest capital comparable to a savings bank investment. Cultural difficulties are more serious, but are due largely to the attempt to bring about the conversion through the establishment by natural reproduction of seedling stands with a regular distribution of age classes.—The state forests of Bourse and of Écouves prove that, at least in the oak and beech stands of western France, the establishment of satisfactory high forests from thrifty trees of sprout origin is not only comparatively easy from a cultural point of view, but can be effected at a considerable saving of time and money. The conversion can be brought about either by allowing the stand of coppice to keep right on growing, with occasional thinnings to prevent its becoming too dense; or by making a "conversion cutting" which would remove the bulk of the trees, leaving several hundred carefully selected reserves to the hectare, most of which would be of the same age as the main stand. The latter method has the advantage of yielding an immediate revenue and of affording the best possible growing conditions for the trees left. One area treated in this way which had to be prematurely clear cut 38 years later during the war yielded 4000 francs per hectare, exclusive of previous thinnings, as against an estimated yield of 1200 francs per hectare had the conversion not been undertaken. With suitable species, vigorous trees, and good soil, the method is applicable to private as well as to public forests. When conditions are unfavorable in these respects clear cutting and planting or underplanting with silver fir is usually necessary.—Private owners, who will ordinarily make the "conversion cuttings" from five to ten years earlier than the State, will find it advantageous to leave a larger number of reserves, say 1000 per hectare in a 23-year-old stand. It is usually advisable to remove old reserves already on the ground, not only because of the revenue to be derived from them but because their subsequent growth is likely to be unsatisfactory and to interfere with the best development of the rest of the stand. In selecting reserves to be retained, the species and general vigor of the trees are more important than their origin. The object of the method is not to obtain a stand of natural seedlings in some far off future, but to effect the immediate conversion of a coppice stand into high forest with a view to securing the maximum yield of timber.—*S. T. Dana.*

755. Baker, E. **Methods of fire protection, with special reference to fires caused by sparks from railway engines.** Jour. Dept. Agric. Union of South Africa **1**: 414–421. *5 fig.* 1920.

756. Baleriola, Gaspar. **La poda de las morreras. [Mulberry pruning.]** Informacien Agric. [Madrid] **10**: 218–220. *4 fig.* 1920.—The method of pruning mulberry trees to secure the maximum yield of leaves for silk-worm culture is described.—*John A. Stevenson.*

757. Barbey, A. **Chronique suisse. [Swiss notes.]** Rev. Eaux et Forêts **58**: 136–138. 1920.—The economic crisis in Switzerland caused by the war still continues, with high prices for both timber and firewood and comparatively little building activity. While forest devastation has not been general, it is necessary to use every means to make the forests more productive. By more intensive management, made possible largely by decreasing the area under the supervision of each forest officer, it should be feasible to increase the annual

production of the public forests from 2.7 to 4.4 million cubic meters, thus making the country independent of wood imports aside from exotic timbers. The recently created "central forest office," with headquarters at Soleure, should prove effective in supplementing other activities to awaken public interest in and support of the practice of better forestry.—*S. T. Dana.*

758. Barbey, A. **Wald und Schlachtfeld. [Forest and battlefield.]** Schweiz. Zeitschr. Forstw. **71**: 257–261. *4 pl.* 1920.—The forest was completely destroyed over large areas, and in other sections there are only dead parts of trees left. In France the estimated areas destroyed include 100,000 ha. state forest, 140,000 ha. community forest, and 275,000 ha. private forests; also 10,000 to 15,000 ha. in Elsass—a total of about 530,000 ha. (1,325,000 acres). This forest is so completely destroyed by shells and fire that no young growth is coming in. The area is being covered with weeds and shrubs among the tangles of barbed wire and shell holes. Utilization of the remaining dead timber is not feasible in many places unless charcoal industries are developed. Insect infestations are occurring and no doubt will spread rapidly. Reforestation with the species that occurred before will not be possible in some sections where the soil is badly torn up. Such areas may be restocked with broad-leaved species to build up the soil.—*J. V. Hofmann.*

759. B(ean), W. J. **One-leaved ash (Fraxinus excelsior heterophylla).** Kew Bull. Misc. Inf. [London] **1919**: 390–391. 1919.—See Bot. Absts. 6, Entry 1631.

760. Bean, W. J. **Garden notes on new or rare trees and shrubs.** Kew Bull. Misc. Inf. [London] **1920**: 119–124. 1920.—See Bot. Absts. 6, Entry 1843.

761. Berkhout, A. H. **Het meten der boomen in verband met hun aanwas. [The measurement of trees in connection with their growth.]** Meded. Landbouwhoogeschool en Verbond. Instit. Deel **17**: 109–225. 1920.—Uses the standard deviation of individual varieties and of the mean as a measure of reliability. Uses the "correlation factor" in examining relationship such as that between diameter and volume, with coefficients as high as 0.98. Shows the correlation graphically in addition. In some other correlations the values are much lower. "It is indeed unfortunate that in forest mensuration use of probability computations is seldom or never made, for they are especially applicable in forestry."—*Carl Hartley.*

762. Bintner, J. **Silver leaf disease. Stereum purpureum.** Kew Bull. Misc. Inf. [London] **1919**: 241–263. *Pl. 8, fig. 1–8.* 1919.—See Bot. Absts. 6, Entry 1936.

763. Boulger, G. S. [Rev. of: Henry, Augustine. **Forests, woods and trees in relation to hygiene.** *xii + 314 p., 50* illus. Constable & Company: London, 1919.] Jour. Bot. **58**: 157–158. 1920.

764. Boulger, G. S. [Rev. of: Stone, Herbert. **A guide to the identification of our more useful timbers, being a manual for the use of students of forestry.** *72 p., 3 pl.* University Press: Cambridge, 1920.] Jour. Bot. **58**: 230. 1920.

765. Brown, Forest B. H. **The silicious skeleton of tracheids and fibers.** Bull. Torrey Bot. Club **47**: 407–424. *5 fig.* 1920.—See Bot. Absts. 7, Entry 1057.

766. Burns, George P. **Tolerance of forest trees and its relation to forest succession.** Jour. Forestry **18**: 610–615. 1920.—A general review of the literature shows a general disagreement as to the meaning of the term *tolerance.* It is used rather indiscriminately in forestry practice but has been tied up with light more often then otherwise. No clear definition has been given and much confusion caused, and the question of what is meant and how it is brought about will have to be solved by forest research.—*E. N. Munns.*

767. Cambage, R. H. **Notes on the native flora of New South Wales. Part 10. The Federal Capital Territory.** Proc. Linnean Soc., New South Wales 43: 673–711. *Pl. 71–74.* 1918.—See Bot. Absts. 6, Entry 1515.

768. Cardot, E. **La reconstitution forestière. [Forest reconstruction.]** Rev. Eaux et Forêts 58: 121–123. 1920.—The efforts of the Administration of Waters and Forests, following the Franco-Prussian war, to convert the stands of coppice in the national forests into high forest yielded comparatively small results. This was primarily caused by an exaggerated idea of the loss in annual revenue that would be necessitated by the conversion, by the attempt to use a complicated system of management by natural regeneration with regular thinnings and an even distribution of age classes, and by the many practical difficulties encountered in putting this system into effect. A series of articles starting in this issue of the Revue points out a simple, practical system of avoiding these difficulties and of effecting the conversion with purely temporary and insignificant reductions in current revenue. While the author apparently claims the system to be effective only in western France, it would seem to be applicable, with slight modifications, to most, if not all, of the coppice stands in the country.—*S. T. Dana.*

769. Cheeseman, T. F. **Contributions to a fuller knowledge of the flora of New Zealand: no. 6.** Trans. and Proc. New Zealand Inst. 51: 85–92. 1919.—See Bot. Absts. 6, Entry 1516.

770. Cribbs, James E. **Ecology of Tilia americana. I. Comparative studies of the foliar transpiring power.** Bot.Gaz. 68: 262–286. *13 fig.* 1919.—See Bot. Absts. 6, Entry 1498.

771. De Brun, H. **Contre les incendies en Vaucluse. [Fire protection in Vaucluse.]** Rev. Eaux et Forêts 58: 264–267. 1920.—The application of the forest fire laws of 1893, 1898, and 1902 should be extended to include the department of Vaucluse. Every effort should be made to prevent fires from starting by prohibiting smoking in the forest and by delaying the opening of the hunting season; and to control them after they have started by organizing permanent fire-fighting crews composed of local volunteers. These crews should be specially trained for their work and should be paid by the communities concerned, which should, however, be assisted by subsidies from the state and the department.—*S. T. Dana.*

772. De la Hamelinaye, H. **Rapport du diamètre à 1^m 30 au diamètre de la souche. [Relation between breast high and stump diameters.]** Rev. Eaux et Forêts 58: 133–135. 1920.—Measurements of a large number of stumps of oak and beech in the forests of Gers-Hautes, and Basses-Pyrénées showed that the sum of the largest and smallest stump diameters, measured at the surface of the ground, was approximately equal to the sum of the circumferences of the same trees measured at breast height (1.30 m.). In other words, the average diameter at breast height in the case of these two species was equal to 63 per cent of the mean diameter of the stump at the surface of the ground.—*S. T. Dana.*

773. Demorlaine, J. **La sylviculture et les chars d'assaut. [Silviculture and tanks.]** Rev. Eaux et Forêts 58: 235–236. 1920.—During the war the forest of Compiègne was used as a practice field for tanks, the caterpillars of which broke up the ground so as to form an excellent seed bed. As a result the heavy beech-nut crop of 1918 was followed by the establishment of a remarkably dense stand of seedlings. This suggests the possibility of using tanks regularly in beech and oak forests during good seed years in order to stir up the soil and thus favor natural reproduction, at the same time giving the tanks an opportunity to practice their maneuvers under difficult conditions. Similarly, caterpillar tractors might be used to advantage from a silvicultural point of view for the hauling of logs in lumbering operations.—*S. T. Dana.*

774. Detwiler, Samuel B. **White pine blister rust control in 1919.** Amer. Plant Pest Committee Bull. 4: 1–10. 1920.—See Bot. Absts. 7, Entry 1224.

775. Dore, W. H. **The distribution of certain chemical constants of wood over its proximate constituents.** Jour. Indust. Eng. Chem. 12: 472–476. 1920.—A study is made of the distribution of the groups contained in red wood which yield furfurol acetic acid and methoxy with the object of learning their relation to the constituent cellulose and lignin.—*Henry Schmitz.*

776. Dore, W. H. **The proximate analysis of coniferous woods.** Jour. Indust. Eng. Chem. 12: 476–479. 1920.—An improved procedure is described for the summative analysis of coniferous woods. Methods are given for the estimation of the following constituents: those lost on drying, benzene extract, alcohol extract, cellulose, lignin, soluble pentosans, mannan and galactan.—*Henry Schmitz.*

777. Dore, W. H. **The proximate analysis of hardwoods: Studies on Quercus agrifolia.** Jour. Indust. Eng. Chem. 12: 984–987. 1920.—The methods previously used for the analysis of coniferous woods were investigated as to their applicability to the hardwoods. The purification treatment employed for the tissues of coniferous woods was supplemented with digestion in cold water and 5 per cent sodium hydroxide solution. Lignin was determined by the gaseous hydrochloric acid method recently proposed by König and Becher. This modified method was found satisfactory in every respect.—*Henry Schmitz.*

778. Dupler, A. W. **Staminate strobilus of Taxus canadensis.** Bot. Gaz. 68: 345–366. *3 pl., 22 fig.* Nov., 1919.—See Bot. Absts. 6, Entry 1898.

779. Ehrhorn, E. M. **Notes on plant shipment.** Hawaiian Forester and Agric. 17: 4–6. 1920.—See Bot. Absts. 6, Entry 1942.

780. Engler, A. **Die Vegetationsverhältnisse des Kongoa-Gebirges und der Bambuto-Berge in Kamerun [West Africa]. [The vegetation of the Kongoa Mountains and the Bambuto Mountain in Kamerun.]** Bot. Jahrb. 55 (Beiheft): 24–32. 1919.—See Bot. Absts. 6, Entry 1505.

781. Ewart, A. J. **Contributions to the flora of Australia, No. 27.** Proc. Roy. Soc. Victoria 31 (N. S.): 367–379. *Pl. 18.* 1919.

782. Fankhauser, F. **Der Lawinenverbau Mittels Terrassen. [Preventing avalanches by terracing.]** Schweiz. Zeitschr. Forstw. 71: 217–230. *8 pl.* 1920.—Avalanches occurred quite frequently near Elm on slopes from 70° to 90°. These slopes were covered with unbroken sod which give little resistance to sliding snow. Terracing has been successful in preventing slides here and elsewhere. Terraces were first built as early as 1756. They were constructed of laid walls of rock and were only partially successful. Later walls were built of well-laid rock with widened bases. These were often loosened and torn away in the course of two or three seasons. The best construction has been found to consist of alternate layers of rock and sod, with the sod blocks projecting over the rock so that the grass will grow over the entire wall the first or second season. If the sod blocks are trimmed even with the rock wall, the wall soon crumbles and settles irregularly, because the grass does not grow over it and bind the dirt together. The walls are from 1 to 2 m. wide and about 8 m. high, with a slope of about one-fourth the thickness of the wall. The base is set deep enough to prevent undermining by rain and snow water. The terraces are made as broad as possible, in order to give the snow more level bearing surface and prevent sliding.—*J. V. Hofmann.*

783. Flury, Philip. **Aus dem Gebierte unserer Forsteinrichtung. [From the Division of Forest Improvement.]** Schweiz. Zeitschr. Forstw. 71: 137–150. 1920.—This article is a discussion of the views of Biolley and Burger on forest management and improvement as related to methods of cutting. It is pointed out that the two methods are often confused. Clear-cutting may be advisable for forest management, but it is not always the most desirable for forest improvement. Also, forests may be successfully managed by selection cut-

ting, but not necessarily improved. Slope types of fir and spruce are best adapted to selection cutting and natural reproduction, and on the bottom lands hardwood types are better suited to clear-cutting and planting. Mixed forests may be converted to pure beech forests or any desirable species by this method. Annual cuttings must be based on the average increment of different age classes and not on annual increment. An age class may produce abnormal increments for short periods, but cuttings based on this would be too heavy for the entire age class. Hayer's formula is discussed in its relation to annual and age class increment.—*J. V. Hofmann.*

784. Flury, Philipp. **Aus dem Gebierte unserer Forsteinrichtung (Schluss). [Division of Forest Improvement (concluded).]** Schweiz. Zeitschr. Forstw. **71**: 179–199. 1920.—Cuttings and future yield, based on annual increment, are faulty as shown by permanent growth plots. These plots show wide fluctuation due to weather conditions. Growth was retarded in the dry years of 1904, 1906, 1908, and 1911 and greatly accelerated in the wet years of 1912–1916. Growth classes based on diameter measurement must take the smaller classes into consideration. According to the "Méthode du Contrôle" where the smallest diameter taken was 18 cm., stands under 40 years old would not be considered. Measurements taken in divisions of 5 cm. are as applicable as those based on 1 cm. and are much simpler. Cuttings based on 6- to 8-year intervals are too frequent, and no doubt 20-year intervals can be taken to better advantage. However, 10-year periods are advantageous in many conditions. Tabulations are included to show the relation of various methods of determining increment to the different methods of cutting. The author concludes that the present forest compartments are too large for the most efficient management.—*J. V. Hofmann.*

785. Ghose, Manmathanath. **A neglected source of sugar in Bikar.** Agric. Jour. India **15**: 32–39. *3 pl.* 1920.—See Bot. Absts. 6, Entry 1893.

786. Gleason, Henry Allan. **Some applications of the quadrant method.** Bull. Torrey Bot. Club **47**: 21–33. 1920.—See Bot. Absts. 6, Entry 1499.

787. Greig-Smith, R. **The germicidal activity of the Eucalyptus oils. Part 2. The action of the oils in aqueous dilutions.** Proc. Linn. Soc. New South Wales **44**: 311–347. *7 fig.* 1919.—See Bot. Absts. 7, Entry 1282.

788. Guinaudeau, Ch. **Souvenir de Macédoine de Salonique à la frontière Bulgaro-Serbe au point de vue forestier et agricole. [Forest and agricultural conditions in Macedonia.]** Bull Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 189–196. *2 fig.* 1920.—Throughout most of Macedonia from Saloniki to the Bulgarian-Serbian frontier, trees are scarce, erosion is severe, and agricultural development is poor. Reforestation, restriction of grazing, irrigation, and the use of modern methods of crop production are needed to develop the very decided agricultural possibilities of this region. West of Vardor, however, is an area which is more densely populated, better forested, and richer from every point of view. Here the development of transportation facilities and the practice of better forestry and better agriculture can make it one of the flourishing parts of Greece and the source of all sorts of valuable products.—*S, T. Dana.*

789. Guyot, Ch. [Rev. of: Huffel, G. **La forêt sainte de Haguenau en Alsace. [The sacred forest of Haguenau in Alsace.]** *164 p.* 1920.] Rev. Eaux et Forêts **58**: 167–175. 1920.—This work gives a detailed history of the important forests of Haguenau, the area of which (18,000 hectares) has not changed materially since the Roman occupation. The methods of forest management in use at different times are fully discussed and freely criticized. The modifications introduced by the Germans following the Franco-Prussian war are regarded as particularly unfortunate, and as having undone much of the good previously accomplished by the French, in spite of the fact that the methods developed by the latter since 1843 were too theoretical and complicated.—*S. T. Dana.*

790. Hall, Thos. D. **Food value of willow leaves.** Jour. Dept. Agric. Union of South Africa 1: 456–457. 1920.

791. Hawley, L. F., and Calderwood, H. N., Jr. **Tar still operation in hard wood distillation plants.** Jour. Indust. Eng. Chem. 12: 684–686. 1920.

792. Henkel, J. S. **Forestry in Rhodesia. Timber trees in the Umtali Park.** Rhodesia Agric. Jour. 17: 335–339. *2 pl.* 1920.

793. Henkel, J. S. **Forestry in Rhodesia. Two useful softwoods.** Rhodesia Agric. Jour. 17: 238–243. 1920.

794. Hess, N. **Experiences in plant hybridization.** Proc. Amer. Soc. Hortic. Sci. 16: 52–60. (1919)–1920.—See Bot. Absts. 6, Entry 1818.

795. Hiley, W. E. **The fungal diseases of the common larch.** *8 vo., xii + 204 p., 73 pl.* Clarendon Press: Oxford, 1920.—See Bot. Absts. 6, Entry 1947.

796. Huffel, G. **Le mouvement forestier à l'étranger: station de recherches forestières suisse. [Developments at the Swiss forest experiment station.]** Rev. Eaux et Forêts 58: 249–254. 1920.—Since 1900 the Swiss forest experiment station has been studying the influence of a forest cover on stream-flow in two neighboring and comparable water-sheds, one of which was 97 per cent and the other 29 per cent forested. Actual measurements show that forest soils in good condition absorb the bulk of the precipitation, which later runs off subterraneously; while in soils not so protected there is an immediate surface run-off accompanied by erosion and gullying, particularly on steep, turfed slopes. This beneficial influence of the forest is due to the permeability and porosity of its soil rather than to the great hygroscopicity of the humus and moss cover, which if too abundant may actually, after becoming saturated, have the opposite effect and stimulate surface run-off. During periods of rapid snow melting both the peak of the flood and the total discharge were less from the well-forested than from the poorly forested water-shed. The run-off from the former after heavy or torrential downpours was only a third to a half of that from the latter. After prolonged rains the influence of the forest depended on whether the soil was comparatively dry or saturated at the beginning of the wet spell. In any event, however, erosion is less on well-forested water-sheds, and the flood waters from them, having a lower velocity and carrying less detritus, do less damage. During periods of prolonged drought the stream from the well-forested water-shed never went dry, while that from the poorly forested one often did so for a month or two at a time. All of these differences would have been more marked if the well-forested water-shed had not had appreciably steeper slopes than the other, and if the latter had been completely deforested.—*S. T. Dana.*

797. Huffel, G. **Statistique des forêts de l'Alsace-Lorraine. [Forest statistics for Alsace-Lorraine.]** Rev. Eaux et Forêts 58: 185–188. 1920.—The director general of forests at Strassburg has published a 98-page volume of statistical information regarding the forests of Alsace-Lorraine. Among other things this shows that the forest area of the two provinces on April 1, 1916, was 440,594 hectares, of which 31 per cent was owned by the state, 4 per cent was undivided between the state and a commune, 46 per cent was in the hands of communes and public institutions, and 19 per cent was held by private owners. Since 1871 the forest area has decreased 5,673 hectares, or slightly more than 1 per cent. During the same period gross prices of timber have increased 34 per cent and of firewood 47 per cent, but there has been a constant tendency to include smaller and smaller material in the former class. The annual yield of the forests owned by the state and of those undivided between the state and a commune is estimated at 551,422 cubic meters of large timber, including both intermediate and final products. During the war, however, the actual cut and other matters of administration were decidedly abnormal.—*S. T. Dana.*

798. Johnston, I. M. **The flora of the pine belt of the San Antonio Mountains of southern California.** Plant World 22: 71–90, 105–122. *2 fig.* 1919.—See Bot. Absts. 6, Entry 1521.

799. Jolyet, A. **Les bassins d'épuration du Wacken à Strasbourg et l'élevage des Cyprinides. [The purification basins at Strassburg and the breeding of Cyprinides.]** Rev. Eaux et Forêts 58: 195–202. 1920.—The problem of sewage disposal has been solved at Strassburg by the construction of stagnant ponds in which the organic material is assimilated by protozoans, worms, crustaceans, insect larvae, molluscs, etc., and these in turn are eaten by carp and other fish. The latter are entirely safe for human consumption and have no disagreeable taste. One hectare of pond is sufficient to dispose of the sewage from 2000 to 3000 people (nearly ten times as many as can be cared for by filtering the waste water in settling basins), and at the same time to support an abundant population of fish. This method suggests to foresters the possibility of introducing organic matter into the many ponds and streams found in the plains where communal forests cover more than 20 per cent of the land area, and of using these for the breeding of carp and other Cyprinides, which would form an important addition to the food supply of the country.—*S. T. Dana.*

800. K., S. L. **The resin industry: utilization of sand wastes.** Australian Forest. Jour. 3: 172–175. 1920.—A brief discussion of the resin industry, and a short description of the methods of collecting and refining resin.—*C. F. Korstian.*

801. Lecomte, Henri. **Sur la "structure étagée" de certains bois. [On the "storied structure" of certain woods.]** Compt. Rend. Acad. Sci. Paris 170: 705–709. 1920.—See Bot. Absts. 6, Entry 1901.

802. Ledermann, C. **Einiges von der Kaiserin-Augusta-Fluss Expedition [New Guinea.] [Notes on the Empress Augusta River Expedition.]** Bot. Jahrb. 55 (Beiheft): 33–44. 1919.—See Bot. Absts. 6, Entry 1508.

803. Marti, F. **Verbauungen, Aufforstungen und Berasungen in den Einzugsgebieten der Wildbäche. [Damming, afforesting, and sodding the watersheds of the forest lakes.]** Schweiz. Zeitschr. Forstw. 71: 230–244. 1920.—The forest and alpine lakes are a heritage of nature, and the forest life and development often depend on their preservation. Where the watersheds are barren rock or open slopes, the run-off is so rapid that the precipitation causes sudden rising of the lakes and overflowing with resultant damage to the lower valleys. Between the timber line and snow line there is usually an area of barren slopes from 1,000–1,500 m. beginning at an elevation of 1,600–1,800 m. The forests have extended to high altitudes, but the natural forest conditions must not be interfered with, or the timber line will be brought to lower levels. The principal species are the larch and cembra pine. In some localities, large areas of young growth are dying, although the underplanted spruce remains thrifty. Afforestation may be effective in some regions, depending on temperature and precipitation. Wide variations of precipitation occur on different slopes due to direction of storm movements and ridges, Where afforestation is not practicable, the areas should be sown to grass to prevent erosion. In some regions it is necessary to build terraces. Where rock is available it affords the best material for construction, but sod and a mixture of dirt and gravel may also be used.—*J. V. Hofmann.*

804. McLean, R. C. **Studies in the ecology of tropical rain forests, with special reference to the forests of South Brazil.** Jour. Ecol. 7: 121–172. *10 fig.* 1919.—See Bot. Absts. 6, Entry 1500.

805. Mill, R. H. **Woods and water supply.** [Rev. of: Henry, Augustine. **Forests, woods and trees in relation to hygiene.** *XII + 314 p.* Constable and Co.: London, 1919.] Nature 105: 158–159. 1920.—Greater part of volume is devoted to afforestation of water catchment areas. Reviewer agrees with author that the effect of afforestation in increasing the general rainfall is probably negligible in the British Isles.—*O. A. Stevens.*

806. Morel, C. **Activité de l'assimilation chlorophyllienne chez le pin sylvestre, quantité d'eau nécessaire à la végétation d'une forêt de cette essence. [Activity of chlorophyll assimilation and water requirements of Scotch pine.]** Rev. Eaux et Forêts **58**: 163–166. 1920.—Dry wood contains about 50 per cent carbon, and air about 0.3 per cent carbon dioxide. For a forest of Scotch pine to produce 5 cubic meters of wood per hectare per year, it is therefore necessary for the chlorophyll in the leaves to come into contact with 7,715,000 cubic meters of air. This means that during the 1,200 hours of insolation in the period of vegetative activity between May 1 and September 1, the leaves must absorb every second a volume of air equal to nearly one-fifth of their own volume; or, in other words, that the openings in the chlorophyll tissues must fill and empty themselves of air at least every two seconds. The pine leaf is thus far from being an inert organ. Assuming that each cubic meter of air expired contains on the average 20 grams of water vapor, which is certainly a maximum, the leaves would transpire each year 154,000 kilograms of water per hectare. Assuming further that evaporation from the leaves and other parts of the tree is twice the transpiration, the total annual water requirement of the forest is approximately 500,000 kilograms per hectare. This is equivalent to a water blanket over the surface of the soil 5 centimeters in depth. In spite of so small a water requirement, Scotch pine forests sometimes fail to produce a normal amount of wood because they are in general relegated to soils which do not retain capillary water well, because the humus which they produce improves only slightly the physical properties of the soil, because the root hairs occupy a comparatively thin layer of soil, and because the tree itself has but little reserve capacity. While Scotch pine seldom dies of drought, a soil which is desiccated during the growing season may thus result in reduced wood production. Conditions may be considerably improved by underplanting open stands with such species as beech or hornbeam, which produce a heavy leaf litter.—*S. T. Dana.*

807. Morvillez, F. **L'appareil libéroligneux foliaire des Bétulacées, Corylacées et Castanéacées. [The vascular anatomy of the leaves of the Betulaceae, Corylaceae, and Castaneaceae.]** Compt. Rend. Acad. Sci. Paris **170**: 674–677. *12 fig.* 1920.—See Bot. Absts. 6, Entry 1903.

808. Oechslin, M. **Felssturz im Bannwald Altdorf (Uri). [Rock avalanche in the forest of Baun, Altdorf.]** Schweiz. Zeitschr. Forstw. **71**: 150–154. *1 pl.* 1920.—On January 4, 1920, a slide occurred near Moos Lake at an elevation of about 1050 m. The slide started at one point and divided into two paths through the forest. Strips 150 to 200 m. wide were torn out, and all of the timber and rocks were piled at the base. Approximately 10 ha. (about 25 acres) of forest were completely destroyed, including about 2,000 cubic m. of timber, three-fourths of which was buried among the debris. The slide occurred on a 35° to 40° slope. Slides in this region are caused by the porous condition of the soil and rock at the surface, which permits all surface water to penetrate to the impervious bed-rock. Very few springs occur, and those that do are intermittent except at the base of the hills. This condition causes a wet layer to form at the surface of the bed-rock, and during periods of wet snow or heavy rainfall avalanches result.—*J. V. Hofmann.*

809. Ogura, Yudsuru. **Some observations on the growth in thickness in trees, especially with regard to that of Cryptomeria japonica.** Bot. Mag. Tokyo **34**: 81–109. 1920.—See Bot. Absts. 7, Entry 1068.

810. Olmsted, Fredrick E. **National forest policies: a critical review of the several plans.** Jour. Forestry **18**: 598–609. 1920.—An analysis is presented of the mauor features of the national forest programs proposed by the United States Forest Service, the American Paper and Pulp Association, the National Lumber Manufacturers' Association, and the Society of American Foresters. Of these, the last is preferred as it provides for direct national control, and is far better than any state administration because of freedom from politics, firmness of purpose, and efficiency.—*E. N. Munns.*

811. Patton, R. T. **On the growth, treatment and structure of some common hardwoods.** Proc. Roy. Soc. Victoria 31 (N. S.): 394–411. *Pl. 21, 7 fig.* 1919.—The forest management, the seasoning, and some notes on the structure of mountain ash, *Eucalyptus regnans*, are discussed. At present there are no managed forests of known age, so that methods of constructing yield tables must be worked out. Schlich's method of selecting an average tree per plot is criticized. An average of as many typical trees as possible is preferred. Difficulty is experienced in counting rings after ninety years. Some data are also given on blackwood, *Acacia melanoxylon*. Growth curves of the two Australian species are compared with curves for cluster pine from Portugal and for spruce. Rapid growth is apparent from the first, but the eucalypt appears to have an anomalous growth curve. No evidence for the reputed slow growth of blackwood was found. Good cabinet timber could be grown in forty years. Doubt was expressed concerning the statement that mountain ash will grow an average 30-inch butt in 40 years; also concerning current height growth figures for eucalypts. The tallest seen by the writer were 261 and 249 feet, respectively. There is an official record of 326 feet. In the yield curves, relations were established between diameter and height, in order to get a workable relation between height and age. Taper in mountain ash was found to be 0.36 inch of the circumference per foot of ascent. Thirty-nine to forty-one trees per acre were found; 50 per acre were advocated, and spacing is as discussed. Seeding 10,000 to 12,000 to the acre was considered about satisfactory. A full and well-formed crown was the end in view.—Natural seasoning conditions are so favorable that doubt is expressed as to the need for kiln drying on a large scale. The fallacy of steaming "to open the pores" is discussed. A test of the effect of steaming on seasoning is given. Matched pieces lost moisture at the same rate, but after three months the steamed pieces began to shrink more than the unsteamed. This was explained as due to a slight breaking down of the wood structure. It was concluded that there is no justification for this practice or for that of end-stacking. A free supply of air on all sides of the material is advocated, and the drying of different surfaces is discussed. The possibility of determining moisture content by measuring electrical resistance is mentioned.—The simple structure of mountain ash with its evenly distributed large pores (average radial diameter, 0.253 mm.) is pointed out, and tests on the length of these are described. The fibers averaged about 1 mm. in length. Sapling fibers were slightly longer than those formed later. The uniseriate rays were very numerous and said to contain nuclei in the cells at the center of trees over 100 years old. No starch was found. The fibers at the center were imperfectly lignified. It is thought that good forestry would reduce the amount of immature wood formed. Tyloses were often associated with the nuclei. In *E. obliqua* tyloses were reported "right up against the cambium." Mountain ash hardens greatly when dried. Its tannin content is objectionable for its use as pulp.—*Eloise Gerry.*

812. Pillichody, A. **Aus dem Grossen Risouxforst. [The great forest of Risoux.]** Schweiz. Zeitschr. Forstw. **71**: 177–179. *1 pl.* 1920.—The Risoux Forest is a large unbroken tract of virgin forest along the French border, stretching over 15 kilometers. It contains 2277 ha. (about 5,690 acres) and is one of the few unbroken tracts of forest land. No utilization of timber from this tract was made until 1904; a road was then built through it, which made possible the use of firewood and poles. A stand of 316 m³. per ha. covers the area, consisting of about 80 per cent spruce, 10 per cent fir, and 10 per cent beech. The forest is from 300 to 350 years old. Where old trees have died or fallen, groups of young trees have sprung up. Such groups usually are suppressed and do not survive. Beech forms an understory and also, by shading, serves in clearing the conifer trunks of small side branches. Diameter classes were taken in 1911 which showed the following percentages in each class: 16–18 cm., 12 per cent; 30–48 cm., 44 per cent; 50 cm. and over, 44 per cent.—*J. V. Hofmann.*

813. Pillichody, A. **Verschiedenes Verhalten gegen Windströmung. [Varying reaction to wind pressure.]** Schweiz. Zeitschr. Forst. **71**: 154–155. *1 pl.* 1920.—Canadian popple and Italian popple were planted at Wallis where they were exposed to severe winds consistently from one direction. At 30 years of age Canadian popple showed a stem decidedly inclined in the direction away from that of the prevailing wind. It produced a good growth and devel-

oped a strong, stocky stem with many branches. The Italian popple produced a straight, upright, slender stem, and few branches, although its growth almost equalled the Canadian. —*J. V. Hofmann.*

814. Pritzel, E **Die Grettstadter Wiesen [Germany].** [**The meadows of Grettstadt.**] Bot. Jahrb. **55** (Beiheft): 83–112. *1 map.* 1919.—See Bot. Absts. 6, Entry 1510.

815. Proschowsky, A. R. **Les Conifères dans les terres calcires sur la Côte-d'Azur.** [**Conifers in calcareous soils at Côte-d'Azur.**] Rev. Hortic. [Paris] **92**: 75. 1920.—See Bot. Absts. 6, Entry 1869.

816. Ramaley, Francis. **Subalpine lake-shore vegetation in north-central Colorado.** Amer. Jour. Bot. **7**: 57–74. *6 fig.* 1920.—See Bot. Absts. 6, Entry 1511.

817. Ramiréz. Gonzalo. **Una neuva planta hulifera.** [**A new rubber plant.**] Rev. Agric. [Mexico] **5**: 118–119. 1919.—Gives a description of a plant (*Cryptostegia madagascariensis*) from Lower California which gives promise as a source of rubber.—*John A. Stevenson.*

818. Rand, R. F. **Wayfaring notes from Great Namaqualand [Southwest Africa].** Jour. Botany **58**: 53–55. 1920.—See Bot. Absts. 6, Entry 1512.

819. Regan, W. S. **The destruction of Ribes by chemical means.** Amer. Plant Pest Committee Bull. **4**: 12. 1920.

820. Ridsdale, P. S. **The Memorial Trees of the United States.** Garden Mag. **30**: 177–180. *2 fig.* 1920.—See Bot. Absts. 6, Entry 1870.

821. Robinson, R. G. **Phases of forestry practice.** New Zealand Jour. Agric. **20**: 36–48. 1920.—Many failures in afforestation are believed to be due to improper varieties, or unwise mixtures of varieties. The importance of good seed is shown by experimental tests. Planting distances should vary according to species and soil. There is danger in planting too close as well as in planting too far apart. It has been found that careful thinning will pay for the labor involved. Plantations of *Pinus insignis* have yielded £100 per acre, and should yield much greater returns if properly handled. Natural regeneration of pine and gum forests is desirable and practical in some instances. Softwoods, hardwoods, and medium woods best suited to New Zealand conditions are listed.—*N. J. Giddings.*

822. Russell, G. A. **A machine for trimming camphor trees.** U. S. Dept. Agric. Dept. Circ. **78**: 3–8. *4 fig.* 1920.—See Bot. Absts. 6, Entry 1989.

823. Schlupf, W. F. **Rodent injury to trees, cause, prevention and repair.** Jour. Dept. Agric. Union of South Africa **1**: 445–455. 1920.

824. Sim, T. R. **Cultivated trees, I.** South African Jour. Indust. **3**: 783–793. 1920.—No species indigenous to South Africa can be recommended for commercial culture, since in every case there are exotic species commercially more profitable. Commercial tree culture can be most profitably undertaken in the natural forest or grass areas of the eastern slope; *i.e.*, in the Knysna Conservancy, Kaffraria, Transkei, Griqual and East, Natal, Swaziland, Transvaal, Bush Veld, and Transvaal Low Veld. In all these areas summer rainfall predominates, except in the Knysna Conservancy, where rains are more or less regular.—*E. M. Doidge.*

825. Struby, A. **Wald und Weide.** [**Forest and meadow.**] Schweiz. Zeitschr. Forstw. **71**: 199–202. 1920.—From "Schweiz. Alpwirtschaftlichen Monatsblätter."—The value of alpine meadows is emphasized and their value compared with that of woodlands. The most productive portions are found among scattered stands of trees, and this feature should be considered in utilizing these meadows. Areas too rough or steep to be used for meadow

should be planted to forest, and strips of trees should be placed on ridges and at places of advantage in sheltering the meadows and the grazing animals. The development of forest and meadow should go forward together for the greatest returns from the area.—*J. V. Hofmann.*

826. Trevor, C. G. **Yield tables for single trees of deodar, kail, chil, spruce and silver fir.** Indian Forester **46**: 439–451. 1920.—Results obtained through 20 years of work are given in the form of tables for the above species. The data are compiled in cubic feet for diameter and age groups and show that the current annual increment culminates around 120 years with diameters of 20–24 inches. Spruce and silver fir have the highest values, with 3.60 per cent at 105 to 115 years; and kail has the lowest, with 1.75 per cent at 75 years. Three site qualities are recognized which are based on total height of the trees.—*E. N. Munns.*

827. Unwin, A. N. **African softwoods for pulp production.** Nature **105**: 599. 1920.—The following might be of use: *Eriodendron anfractuosum, E. orientale, Bombax buonopozense, Triplochiton Johnsonii* and *T. nigericum* (wood similar to spruce, fibers long, reproduction easy and growth rapid), *Sterculi Barterii* (growth very rapid), *S. tragacantha, Terminalia superba, Alstonia congensis, Ricinodendron Hendelotii, Pycanthus kombo, Musanga Smithii.* The baobab, *Andansonia digitata,* has been suggested as suitable, but is usually scattered and remote from navigable waterways.—*O. A. Stevens.*

828. Watson, Russell. **Summer planting of white pine on the Michigan state forests.** Jour. Forestry **18**: 623–624. 1920.—Planting of *P. strobus* seedlings in Michigan was carried on weekly from June to September, and the results appear to show that fall planting can profitably be begun in August, and that the losses from summer planting were not as great as might be expected.—*E. N. Munns.*

829. Watt, A. S. **On the causes of failure of natural regeneration in British oakwoods.** Jour. Ecol. **7**: 173–203. 1919.—See Bot. Absts. 6, Entry 1501.

830. Weidman, Robert H. **A study of windfall loss of western yellow pine in selection cuttings fifteen to thirty years old.** Jour. Forestry **18**: 616–622. 1920.—On government sales of timber in Oregon, a heavy windfall loss is experienced in *P. ponderosa* stands the first few years after cutting. The winds causing such loss are quite common in the region, and fear of continued losses was felt. Observations on older cuttings of private operators who cut their holdings in a manner similar to that practiced on timber sales, show that the heavy losses, both in actual number and in volume, occur only in the first decades following the opening in the stand, the decrease in numbers being more prominent than in volume because of the large trees involved in the later windthrows, which, however, are not left under present marking practice. The loss is that of the weakest trees and is heaviest in the early stage, for after exposure the trees strengthen their root system. The study shows that the subsequent losses on sales should be slight.—*E. N. Munns.*

831. Weiss, Howard F. **Relation of research to forest management.** Jour. Forestry **18**: 590–597. 1920.—Attention of research workers in utilization and properties of woods might better be concentrated on the species of rapid growth than on those of slow growth, even though the slower-growing woods are at present of slightly higher value. Forest management of the future will be intimately tied up with the relation existing between yields and the cost of production, which invariably favors the faster-growing species. Research in products has already resulted in increased revenues from lands, and similar work should stabilize industries which are dependent on fluctuating markets.—*E. N. Munns.*

832. Wilson, E. H. **The romance of our trees. VII. The beeches.** Garden Mag. **31**: 115–119. *4 fig.* 1920.—See Bot. Absts. 6, Entry 1471.

833. Wilson, E. H. **The romance of our trees. IX. Whence came the common fruits.** Garden Mag. **31**: 259–263. 1920.—See Bot. Absts. 6, Entry 1472.

834. Wilson, E. H. **The romance of our trees. X. The Lombardy poplar and the Babylon willow.** Garden Mag. 31: 317–320. *5 fig.* 1920.—See Bot. Absts. 6, Entry 1473.

835. Wilson, E. H. **The cedars of Lebanon.** Garden Mag. 30: 178–183. *4 fig.* 1919.—See Bot. Absts. 6, Entry 1876.

836. Wilson, E. H. **The romance of our trees. II, The Ginko.** Garden Mag. 30: 144–148. *7 fig.* 1919.—See Bot. Absts. 6, Entry 1877.

837. Wimbush, A. **Artificial regeneration of teak by sowing.** Indian Forester 46: 488–492. *Pl. 21.* 1920.—Experience gained in the past work shows that early felling of the cover crop is necessary to allow time for drying before burning, that seed should be carefully selected and a nursery established on the ground, and that the grass should be cut before seeding takes place.—*E. N. Munns.*

838. Zon, R. **Effect of forests upon streamflow.** [Rev. of: Engler, Arnold. **Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer.** Mitteil. Schweiz. Zentralanst. Forst. Versuchsw. Zürich, 1919.] Jour. Forestry 18: 625–633. 1920.—Twenty-years' record of the Emmental Experiment Station in Switzerland and ten-years' of the Wagon Wheel Gap Station in Colorado have been completed, and so far the results are directly comparable. In Switzerland it has been found that the annual run-off from the forested and non-forested areas is approximately the same, the chief difference in the disappearance of water being due to evaporation from the surface and the transpiration from the cover. Forest cover has a beneficial effect upon the régime of streams; and landslides, which occur more or less regularly on open lands, rarely occur in forested basins. Forests, it is shown, have a beneficial effect on the discharge and the amount of material in the water, and that floods are less pronounced, though previous climatic conditions have a marked effect upon the run-off and absorption in the soil. The chief effect of the forest appears to be upon the permeability of the soil and consequently upon water absorption. The moisture content of the soil is higher than in the open because of ground water, drouth in the open depleting this reservoir, which is maintained by the forest cover.—*E. N. Munns.*

GENETICS

G. H. Shull, *Editor*

J. P. Kelly, *Assistant Editor*

839. Åkerman, Å. **Jakttagelser rörande stråfusarios på varvete sommaren 1917. [Observations on a Fusarium disease of spring wheat.]** Sver. Utsädesfören. Tidskr. 28: 82–89. 1918.

840. Allen, E. J., and E. W. Sexton. **Eye-colour in Gammarus.** Jour. Genetics 9: 347–366. *1 pl., 1 diagram.* Mar., 1920.—In *Gammarus chevreuxi* the eye is normally reniform and pigmented black. In the second laboratory generation a red-eyed mutant appeared, Red-eye is a simple Mendelian recessive to black, the F_2 ratio being 3: 1. In a second mutation, called albino eye, the eye not only lacks pigment but is "imperfect;" it is small and variable in size and shape, and has few ommatidia, which are irregularly distributed, and has unevenly distributed white pigment (distribution regular in normal eye). Albino eye is a simple recessive to color. Albino-eyed specimens all carry a factor for color—some for black, some for red, some for both. The white eye pigment in both colored and albino eyes is quite variable in amount. Absence of this white pigment occurs both in pigmented- and albino-eyed stock. "No-white" is a simple recessive to pigment. This is a not uncommon mutation appearing in some families of all the author's stocks and was seen in another species of wild *Gammarus*. This mutation begins in at least two different ways: (a) it may appear suddenly either with one eye or with both eyes affected, or (b) it may develop gradually; *e.g.*, parents with thin reticulation giving some young with thin reticulation, and some "no-white." "In the albino-eyed stocks the white extra-retinal pigment shows a tendency to break up, and

portions of it become detached from the eye." These white spots may occur in any of several positions on the head and first body segment. Spots have occurred in all the experimental stocks, but seem to run in particular families; they are most frequent in albino stock and frequent in red, heterozygous for albino. "The spots appeared almost simultaneously in our different stocks." The authors present briefly a considerable number of data involving many individual matings, from many of which 300 or more young were obtained. Authors conclude that "the inheritance of spots did not follow the simple Mendelian law. The spotted condition did not behave either as a pure dominant or a pure recessive. Spotted animals mated together always gave both spotted and unspotted offspring. One point, however, came out clearly, namely, that albino and coloured strains carrying albino gave a much larger percentage of spotted young than do pure coloured strains. There is a possibility that the inheritance of spots follows some complicated Mendelian law. . . . . The Mendelian ratios 3:1, 9:7, 15:1 frequently occur in some of the best cases we have, where figures are large, but it is hard to find a consistent theory."—This study, parts of which have been set forth in earlier papers, probably represents the first Mendelian analysis of hereditary characters in Crustacea.—*A. M. Banta.*

841. Alverdes, Friedrich. **Über das Manifestwerden der vererbten Anlage einer Abnormität. [On the manifestation of the hereditary factor of an abnormality.]** Biol. Zentralbl. **40**: 473–480. Oct., 1920.

842. Anonymous. **British cytology.** [Rev. of: Doncaster, L. **An introduction to the study of cytology.** *XIV + 280* p., *24 pl., 31 fig.* Cambridge University Press: Cambridge, England. 1920.] Nature **105**: 190–191. 1920.

843. Anonymous. **Rapid Cyclamen culture and raising hybrids.** Florists' Exch. **50**: 1070. Nov. 20, 1920.—Suggestions on *Cyclamen* culture and possibilities of hybridization between different species and related genera, such as *Dodecatheon.* Greenhouse *Cyclamen* originated from *C. persicum* and *C. laciniatum,* the latter contributing the fringe types.—*Orland E. White.*

844. Anonymous. **Scottish station for research in plant breeding.** Pharm. Jour. **103**: 191. 1919.—By private subscription, supplemented by government funds, money is being accumulated for the founding of the above-named institute. It is hoped that part of the work of the station will result in the introduction of improved agricultural varieties of plants such as will help in solving problems of food production and of rural employment. In developing the station Scotland is keeping abreast of England and Wales where provision is being made for botanical research under similar conditions.—*Wilber Brotherton, Jr.*

845. Anonymous. **The progress of genetical research.** Gard. Chron. **68**: 175. Oct. 9, 1920.—Editorial comment and partial review of Miss Saunder's presidential address to the Botanical Section of the British Association. Notes increasing complexity of Mendelian phenomena. Some plant characters are expression of a single factor, while others depend on simultaneous presence of several factors. Hairiness in *Lychnis vespertina* depends on one factor. Hairy × glabra gives hairy in F_1 and 3 hairy: 1 glabra in F_2. In stocks, Saunders has shown hairiness depends on presence of four factors, the absence of any one of these giving glabrous plants. Ligules on oats due to four or five factors, the presence of any one of which gives rise to ligule. Heribert-Nilsson shows *specific* or *species* characters are not exempt from Mendelian law. In *Salix* (willows) those characters regarded by systematists as of specific value depend on normal-acting Mendelian factors. Specific-character factors more general in effect on plant structure than varietal-character factors. Former, unlike latter, may affect many or all parts of plant, thus bringing about striking peculiarities in general appearance of plant. These facts may throw light on why some species, outwardly very distinct, are easily crossed with each other, while others, to the eye much more nearly alike, give no results when crossed together. Suggests that apparently wide differences between species in some cases may be due to relatively few factor differences. Comments on Greg-

ory's work on giant forms of *Primula* and on Saunders's studies on linkage in stocks. Horticulturists generally should welcome suggestion of Miss Saunders, that there should be more organized coöperation between all those sections of investigators and breeders interested in laws of heredity and improvement in plants and animals.—*Orland E. White.*

846. Anonymous. **On the selection of Hevea brasiliensis.** Kew Bull. **1920**: 113–119. 1920.—Brief account drawn from Dutch sources. Improvement in rubber production may be effected by (1) generative selection, isolation of high-yielding strains by seed selection, and by (2) vegetative selection, multiplication of high yielders by grafting, budding, and cuttings. Under (1) establishment of isolated seed nurseries made up of two high yielders propagated by grafting is advocated. This method should be continued through successive generations in order to isolate high-yielding strains. Artificial pollination is practicable, and methods are described. *Hevea* appears normally to be self-sterile. Under (2) methods of grafting and budding and of striking cuttings and securing good stock for cuttings are described. Multiplication by cuttings is favored. In selection of trees high and constant yield of latex is chief desideratum, but state of health and hereditary qualities are also considered. Introduction and trial of new types and species of *Hevea* may result in further improvement.—*R. E. Clausen.*

847. Anonymous. **Hybrids of Gladiolus primulinus.** Gard. Chron. **68**: 105. Aug. 28, 1920.—Most hybrids of *G. primulinus* exhibit marked likeness to the same in form and elegance but show considerable color variation.—*J. Marion Shull.*

848. Anonymous. **A mule in the vegetable kingdom.** Tropic. Life **16**: 139. 1920.—According to the London correspondent of the North Queensland Register, Mr. F. J. Moore, of Lion Creek in the Rockhampton District of Queensland, reports an apparent natural hybrid between banana and paw-paw. A clump of bananas growing in close proximity to a small paw-paw tree produced a bunch of fruit which looked like small plantains, but on being opened they were found to contain seeds resembling paw-paw seeds.—*H. N. Vinall.*

849. Anonymous. **The genetics of strawberries.** [Rev. of: Richardson, C. W. **Some notes on Fragaria.** Jour. Genetics **10**: 39–46. *2 fig.* July, 1920.] Gard. Chron. **50**: 211. Oct. 30, 1920.

850. Anonymous. **The structure of the nucleus.** [Rev. of: Agar, W. E. **Cytology: with special reference to the metazoan nucleus.** *XII + 224 p.* Macmillan & Co.: London, 1920.] Nature **105**: 482–483. 1920.

851. Arber, A. **The "Law of loss" in evolution.** Proc. Linnean Soc. London **1919**: 70–78. 1919.—Law of loss means the "general rule that a structure or organ once lost in the course of phylogeny can never be regained; if the organism subsequently has occasion to replace it, it cannot be reproduced, but must be constructed afresh in some different mode." Examples cited are loss of roots in *Ceratophyllum* and *Utricularia* and substitution of special subterranean shoots; failure of ciliated sperms to reappear in aquatic Angiosperms with submerged fertilization; replacement of perianth in *Naias* with cupular outgrowth of receptacles; loss of opposable thumb or great toe in tree kangaroo, with substitution of enlargement of claws; and others from plants and animals. Operation of law of loss may be favorable "by closing well-worn paths and thus indirectly encouraging the opening of fresh routes."—*A. Franklin Shull.*

852. Armbruster, Ludwig. **Messbare phaenotypische und genotypische Instinktveränderungen. Bienen und Wespengehirne, neu verglichen und als Mass benutzt in Fragen der Stammes- und Staatengeschichte sowie Vererbung und Genogenese. Nebst Anhang über Nomada. [Measurable phenotypic and genotypic changes of instinct. Bee and wasp brains compared anew and used as a measure in questions of race and state history as well as heredity and genogenesis, with an appendix concerning Nomada.]** Archiv Bienenkunde **1**: 1–40. *5 pl.*,

8 fig. 1919.—Author reviews and continues work of late von Alten on fungiform bodies, central nervous structures of Hymenopterous brain. From transverse sections of brain von Alten made the following measurements: Total diameter of fungiform bodies (a), height of fungiform bodies (h), total diameter of protocerebral lobes (b), and total diameter of fibrous part of optic lobes (c); b and c are relatively constant and serve as standards in brain index devised by author, $a/b + a/c + h/b + h/c$. Comparison of brain indices of sexes and casts of various aculeate species shows that size of fungiform bodies is correlated with degree of development of instincts. In general, solitary species stand below social, and simpler solitary below more complex, Size of insect as whole, or size or shape of head, does not affect index. Species of one and same genus may have rather widely diverse brain indices. Bees with ventral scopa do not stand below those with scopa on legs, but the two groups run parallel. Digger wasps apparently run parallel to solitary bees. Social wasps in every case run parallel to social bees. Among social bees, the bumble bee has much higher index than the honey bee. This is to be expected from fact that latter is far below former in structure, such as length of tongue, and in instincts; for social life is not necessarily an indication of high position in scale of development. Consider termites, for example. Sex dimorphism appears from lowest to highest species, females in general having larger brains. Among social aculeates male brain is the most weakly developed. Of female brains, that of worker is better developed only in ergatotelic honey bee, while in gynaecotelic bumble bees and wasps queen has larger brain. This is correlated with fact that queen honey bee is practically a parasite for life upon worker colony while in gynaecotelic forms queen must found colony. In solitary parasite, *Nomada*, and still more so in social parasite, *Psithyrus*, male possesses the more highly developed brain. In *Nomada*, brain indices of both male and female are very high for parasites, while in *Psithyrus*, index for male corresponds to average brain index of other bumble bees. In parasitic forms, therefore, brain of female tends to retrogress, while that of male remains to show from whence species has diverged. Resemblance of parasite to host is not to be explained by mimicry but by relationship. General subject of genogenesis, which lies at root of species problem, is considered. Males having reduced chromosome number should be especially subject to mutation and yet, in spite of diverse environments, parasitic males have not changed and females have remained parasites. Difference in feeding causes phenotypic differences of form and instinct between queens and workers. Question is raised as to how this phenotypic difference became genotypic, as in transformation of phenotypically parasitic queen of *Apis* or *Bombus* into genotypically parasitic *Psithyrus*.—*P. W. Whiting.*

853. Ballard, W. R. **Notes on geranium breeding.** Amer. Soc. Hort. Sci. 1918: 62–65. 1918.—Recounts breeding work done to secure disease resistance. Because of hybrid nature of most varieties considerable segregation occurs in F_1 generation: Singles × singles gave 84 singles and 6 doubles; singles × doubles gave 59 singles and 74 doubles; doubles × doubles gave 40 singles and 30 doubles. Correlation indicated between presence of nectar tubes and singleness of flower. Little success attended effort to hybridize different species; Lady Washington type will combine with some of the scented-leaved types, and the zonal group will hybridize with the ivy-leaved section but not with either the show or scented-leaved groups. —*J. Marion Shull.*

854. Bally, Walter. **Die Godronschen Bastarde zwischen Aegilops- und Tricumarten. Vererbung und Zytologie. [The Godronian hybrids between species of Aegilops and Triticum. Heredity and cytology.]** Zeitschr. indukt. Abstamm. Vererb. 20: 177–240. *4 fig.* Feb., 1919.

855. Barclay, J. R. **Scottish pure-bred live stock. I. Aberdeen-Angus cattle.** Scot. Jour. Agric. 2: 456–464. *4 pl.* 1919.—A brief account of the early history of the Aberdeen-Angus cattle, of the present characteristics of the breed, and of the success attained in all parts of the world in competition with other beef breeds.—*Sewall Wright.*

856. Bayon, H. **Racial and sexual differences in the appendix vermiformis.** Anat. Rec. **19**: 241–249. Sept. 20, 1920.—Statistics based on surgical records distinctly indicate a greater frequency of appendicitis in the white race than in the negro, but the records are shown to be subject to error in favor of the white frequency. Therefore, a comparative study of structure of the appendix was undertaken to determine if there are racial and sexual differences, with special reference to "susceptibility to inflammation." One hundred appendices, recently removed, many for other causes than appendicitis, were examined as to both gross and microscopic characters. The following results were obtained:—(1) "The musculature of the white appendix . . . . seemed slightly stronger than that of the negro;" (2) the white appendix on the average "is shorter and wider;" (3) is "richer in crypts;" and (4) is "rich in lymphocytes and poor in vascularity," while the negro is exactly the reverse. Considered in relation to "other diseases of the lymphatic system," these findings "seem to prove that the white race is more subject to lymphocytic stasis than the negro."—As to sexual differences, it was found that the male appendix is "longer and wider than the female" and the latter is richer in fat, conforming in these respects with prevailing sex differences.—*H. J. Banker.*

857. Blakeslee, A. F. **Sexual differentiation in the bread molds.** Proc. Soc. Exp. Biol. Med. **16**: 131. 1919.—Primitive sexual forms are hermaphroditic, both the gametes, and the plants themselves, differing in size. Interaction of two sexual races, regardless of species, is necessary for production of sexual spores or "imperfect hybridization."—Different races display variations in sexual vigor. Some seem neutral; hermaphrodites sometimes produce races showing hermaphroditic, female, male, or neutral tendencies.—*Andrew I. Dawson.*

858. Blakeslee, Albert F., John Belling, and M. E. Farnham. **Chromosomal duplication and Mendelian phenomena in Datura mutants.** Science **52**: 388–390. Oct. 22, 1920.—The authors have begun a study of the relationship between the cytological condition and the phenomena of mutation and Mendelian inheritance. *Datura Stramonium*, the Jimson weed, upon which they are working, has normally 24 chromosomes in diploid and 12 in haploid. 12 recurrent mutants have 25 in diploid. The extra chromosome is presumably determined by the duplication of a particular chromosome which has been identified as the one carrying the gene for a particular Mendelian character. Duplication may extend to all of the chromosomes producing tetraploid mutants in which the independent assortment of the chromosomes in the homologous sets is found to be the rule.—*Helen Bergfried.*

859. Blaringhem, L. **Hérédité et nature de la pélorie de Digitalis purpurea L.** [**Heredity and nature of the peloria of Digitalis purpurea L.**] Compt. Rend. Acad. Sci. **171**: 252–254. July, 1920. Cross-fertilization of a plant with regular axial peloria, probably recessive as to flower color, with a wild purple-flowered *Digitalis purpurea* were made by the author. From the results of this experiment the conclusion is reached that the peloria of this species is an extreme case of regular hereditary fasciation; when crossed with wild *Digitalis purpurea* the normal cluster form is dominant over the fasciation, with partial, graduated reversion in progeny of the second and third generations. Individual plants or flowers show partial sterility. —*Edith K. Cash.*

860. Blaringhem, L. **Variations florales chez la Grande Marguerite (Leucanthemum vulgare, Lamarck).** [**Floral variations in the large daisy.**] Compt. Rend. Acad. Sci. Paris **169**: 193–195. 1919.—Author calls attention to tendency of this daisy (*Chrysanthemum Leucanthemum* L.) to develop vigorous colonies on recently cleared or exposed land. Time of colony formation favors variation and author reports on group of more than a thousand plants that grew on site of drained pond. Heights of plants ranged from 80–150 cm. while same species in suburbs of Paris ranged from 40–70 cm. In colony were 5 fasciated plants. A single ligulate floret was found metamorphosed into tubular one. Counts on 100 heads for ligule number gave modes at 25 and 33 while in case of 9-year-old culture of

same species at another place there was a single mode at 21 ligules. Numerous foliage variations observed in the drained-pond colony and examination of achenes from ligulate flowers of 25 individuals showed that two had the well-developed crown or pappus characteristic of other species of the genus, two had less-developed pappus, while 21 had naked fruits typical of *L. vulgare* Lam.—*James P. Kelly.*

861. Blaringhem, L. **Production par traumatisme d'une forme nouvelle de Mais á caryopses multiples, Zea Mays var. polysperma. [The traumatic origin of a new form of maize with multiple fruits, Zea Mays var. polysperma.]** Compt. Rend. Acad. Sci. Paris 170: 677–679. 1920.—Hereditary line of maize with a varying percentage of double and sometimes triple grains (caryopses) has been isolated from the author's original teratological cultures in which the main stalk of the plant had been injured. A description of this new strain, called *Z. Mays* var. *polysperma*, is given. A correlation between the double grains on the ear and a corresponding union of the spikelets on the staminate inflorescence was observed.—Isolated in 1907, this strain proved to be exceedingly variable in the number of plants which bore ears with double grains. After five years of selection, the author reports that he has fixed the strain to some extent. His data show approximately fifty per cent of plants with double grains in 1919. At the same time the number of double grains on the ear has increased from 5 per cent to 95 per cent.—The author calls this a typical case of a heritable, acquired character.—*E. W. Lindstrom.*

862. Blaringhem, L. **Stabilité et fertilité de l'hybride Geum urbanum L. × G. rivale L. [Stability and fertility of the hybrid, Geum urbanum L. × G. rivale L.]** Compt. Rend. Acad. Sci. Paris 170: 1284–1286. May, 1920.

863. Bond, C. J. **On certain factors concerned in the production of eye colour in birds.** Jour. Genetics 9: 69–81. Dec., 1919.—Eye colors of birds are arranged in a series. At the bottom is "bull" eye, as found in pigeons, which is due to absence of anterior pigment in iris and background of black pigment in the uvea. Next stage is pearl eye of pigeons and "daw" eye of fowls, caused by colorless granules in the iris, which destroy its translucency. In extreme cases this type of eye may be china-white as in the "wall" eye of dogs, horses and pigs. Yellow or "gravel" eyes are due to a network of branching cells crowded with small spherical yellow granules on the anterior surface of the iris. Brown and black eyes are due to brown or black pigment replacing or covering the yellow (giving triplex condition). The ruby eye is produced by yellow pigment in conjunction with the red capillaries, except in the Cayenne Lapwing, where actual reddish pigment granules are found. Some data on inheritance of the types are given. In general they form an epistatic series, with the simplex "bull" eye at the bottom. There are some complications due to secondary sex relations.—*Leon J. Cole.*

864. Bond, C. J. **On the left-sided incidence of the supernumerary digit in heterodactylous fowls.** Jour. Genetics 10: 87–91. July, 1920.—Author reports that among 38 heterodactylous (five toes on one foot and four on the other) offspring from various crosses of four-toed and five-toed breeds of fowls, 34 had the extra digit on the left side and only four on the right side. Reports slight indication that this situation is more likely to prevail when the female parent belongs to the five-toed breed. Data of other investigators are discussed and the conclusion reached that in birds "there is a tendency during the early cleavage of the ovum which separates the organism into a right and left half, for the factor or factors which control meristic variation to pass to the left rather than to the right half of the developing zygote."—*W. A. Lippincott.*

865. Boring, Edwin G. **A priori use of the Gaussian-law.** Science 52: 129–130. Aug. 6, 1920.—The author criticizes Mr. Michael's interpretation of Dr. Johnstone's results for twenty counts of bacteria in polluted shell fish. He objects to Michael's factoring of a skew distribution into a Gaussian distribution and a skewing factor on the ground that, in absence of observational proof that the frequencies at hand follow the Gaussian law, this

law is meaningless. He also objects to application of elaborate statistical methods when the number of observed cases is as small as in Johnstone's problem and he suggests that the mode and upper and lower quartiles, as determined directly from the observations, give all the information desired.—*Lowell J. Reed.*

866. Bouvier, E.-L., and d'Emmerez de Charmody. **Mutation d'une Caridine en Ortmannie et observations générales sur les mutations évolutives des Crevettes d'eau douce de la famille de Atyidés. [Mutation of Caridina into Ortmannia and general observations on the evolutional mutations of fresh-water shrimps of the family Atyidae.]** Compt. Rend. Acad. Sci. Paris **169**: 317–321. 1919.—Authors have previously stated that certain shrimps or prawns (family Atyidae) of the Indo-Pacific region give rise by mutations to representatives of previously known species of higher genera. Such changes are cited for the following forms:—*Caridina richtersi* to *Ortmannia edwardsi; Ortmannia alluaudi* to *Atya serrata, Ortmannia henshawi* to *Atya bisulcata.* The second of these is reported to have been experimentally proven by Bordage, the two genera having been obtained from the same clutch of eggs. The first is found experimentally by the writers to occur in a brood reared in an aquarium (8 *Caridina* and 1 *Ortmannia edwardsi*). The species which give rise to the forms unlike themselves are quite variable, but the higher forms (to which the derived forms belong) on the other hand, are remarkably stable. Authors think the results not due to hybridization since they do not find individuals with intermediate generic characters and Bordage did not get pairing between the different genera. Results are attributed to evolutional mutations.—*A. M. Banta.*

867. Brotherton, W. E., Jr. **The heredity of "Rogue" types in garden peas (Pisum sativum).** Michigan Acad. Sci. Ann. Rept. **21**: 263–279. *Pl. 7–13.* 1919.—Describes "rogue" type in garden peas, which occurs in varieties with large, wide pods and relatively broad leaves such as Gradus, Duke of Albany, Early Giant and Peter Pan. Rogues differ from type plant of variety in which they arise chiefly in reduced foliage (vetch-like), narrower pods often sickle-shaped or curvature increased, height in general greater, either due to increase in internode number or in internode length; often later-flowering, change from sub-cuneiform seed of type to drum-shaped seeds; rogue seeds average smaller and in green state bitter as compared with sweet type seed. Sterile rogues rarely occur. Usually rogues equal or surpass in productiveness the type. Author mostly worked with rogues from Gradus variety. Per cent of rogues to type in rogue-producing Gradus families was 9.6 (actual figures 5 rogues: 51 type.) Out of 150 Gradus plants selected at random, only one had rogues among progeny. Summarizes data of Bateson and Pellew and confirms their results. In addition, finds in seedling stage, rogue plants are more variable in regard to ratio of length to breadth of stipules than are type plants. Hybrids (rogue × type) resemble rogue parent in this respect. Some evidence that rogues crossed with typical plants of non-rogue-throwing varieties in F_2 and following generations show segregation of width of stipule. Rogues not comparable to any existing variety of pea. Observations are similar to those of White as regards rarity of cross-pollination in peas under field conditions. Cites statement of Starr that percentage of crossed Gradus plants under ordinary field conditions during one season was very high.—*Orland E. White.*

868. Burns, W. **Some aspects of plant genetics.** Agric. Jour. India **15**: 250–276. 1920.—Author's Presidential Address to the Botany Section of the Seventh Indian Science Congress, Nagpur, 1920. Importance of genetics in college or university curriculum is emphasized, and some pedagogical features of the subject are discussed.—Attention is called to problems of bud variation, seedlessness in fruits, and inheritance of sex in plants, and to the intimate relation of plant genetics to cytology and taxonomy.—Limitations in plant genetics are pointed out, and the present lack of knowledge concerning causes of non-adaptive variations, and of mutations is discussed.—*C. M. Woodworth.*

869. Clawson, Benjamin Junior. **Varieties of streptococci with special reference to constancy.** Jour. Infect. Diseases: **26**: 93–116. 1920.—Author sought to discover relation-

ship between classes of streptococci, and their source, habits, pathogenicity, or other characteristics. More than 160 strains were isolated from various sources, pathogenic and non-pathogenic. Cultural characteristics were ascertained from growth on different media, chiefly blood agar, carbohydrates and salicin. Agglutination and complement fixation were applied.—Author concludes that no relationship of source, habitat, or pathogenicity, of the streptococci classes was established; a basis of classification is lacking.—Morphology and carbohydrate fermentation is variable; hemolysis is fairly constant; the hemolytic group is heterogeneous; agglutination shows a high degree of uniformity.—*Andrew I. Dawson.*

870. Cleaver, S. M. **Merino history and merino breeding.** *15 × 23 cm., 48 p., 33 fig.* S. M. Cleaver: Delaware, Ohio, 1918.—A popular account of the history of Merino sheep breeding in America, with a discussion of the various types which have been developed and the difficulties met in trying to combine all good qualities in one type.—*Sewall Wright.*

871. Correns, C. **Eine geglückte Verschiebung des Geschlechtsverhältnisses. Botanische Versuche zur Frage nach der Entstehung des Geschlechts. [A successful modification of the sex-ratio. Botanical researches on the origin of sex.]** Natur u. Technik 2: 65–71. *2 fig.* 1920.—Review of sex determination in animals and plants and experiments on the dioecious plant *Melandrium* (*Lychnis*) which show that the staminate plants are heterogamous and the pistillate homogamous. Results agree with those of Strasburger and of Shull in showing excess of pistillate over staminate plants. Deficient amount of pollen applied also resulted in excess of pistillate plants but when large excess of pollen (more than 100 grains per ovule) was applied, so that competition between male- and female-determining gametes took place, there was even greater excess of pistillate plants: 44 to 56 per hundred in the first case and 32 to 68 per hundred in the second. A moderate excess of pollen of 7 grains to 1 ovule gave an intermediate ratio of 40 to 60.—The faster growth of the female-determining pollen tubes was also shown by comparing the seeds from the top half with those from the bottom half of the same capsule. The seeds resulting from the shorter growth of pollen tubes gave 68, and the seeds from the longer growth 56, per cent pistillate plants. In this plant the pollen tubes enter the ovary at a common point and are all free to fertilize the first ovules to be reached. This was tested by pollinating a white-flowered plant with a small quantity of pollen from a red-flowered plant and 24 hours later with pollen from a white-flowered plant: 71 per cent of the crossed, red-flowered plants came from seeds out of the upper third of capsule as compared to 29 per cent from the lower two thirds. Conclusion: Unequal production of heterogametes and unequal rate of growth of pollen tubes modifies sex-ratio in *Melandrium.*—*D. F. Jones.*

872. Crandall, C. S. **Observations on characters of forms of Malus.** Proc. Amer. Soc. Hortic. Sci. 16 (1919): 131–135. 1920.—The writer bases his observations on 44 standard horticultural varieties and 45 crab forms, and upon 495 parental combinations of them. Most botanical characters of genus are variable. "Petals, 5:" Vary from 4 to 8. Seedlings of variable parent had 10. "Carpels, 2 to 5:" Four out of 32 varieties had constantly 5 carpels; two out of 28 crabs had constantly 5 carpels; in *M. Malus* fl. pl.—81 per cent of fruits varied from 5 to 9 carpels; in *M. spectabilis* 87 per cent had 5 to 12 carpels; in *M. Arnoldiana* 99 per cent and in *M. atrosanguinea* 96 per cent had less than 5 and one of each had 2 carpels. Of 6000 fruits from 23 crab forms, 33.95 per cent varied from 5 carpels. "Ovules, 2 per carpel:" Of 21 standard varieties, only 2 were constant, the variation averaging 8.23 per cent with a maximum of 84.63 per cent. In crabs (25 varieties and species) 12 were constant. In 4 forms, ovules were suppressed, from 1 to 16 less than normal. In remainder there was an excess of ovules from 1 in Yellow Siberian Crab to 300 in *M. spectabilis.* "Calyx lobes persistent or deciduous:" This is a distinctive varietal and specific character. Most cultivated varieties are persistent. Of 41 crab forms, 16 were deciduous, 13, persistent, and in 12, part on each tree were deciduous and part persistent. The writer believes that the instability of this character in most crab forms indicates their hybrid origin.—In F_1 of large leaf × large leaf and small leaf × small leaf (standard varieties), there is a predominance of large-leafed forms, with some small and some intermediate. When large-fruited forms were crossed with

and on small-fruited forms, as *M. floribunda*, *M. Sargentii*, *M. Toringo*, *M. atrosanguinea*, F_1 seedlings resemble small-fruited parent in tree characters, though sometimes in an invigorated form. Some groups of F_1 seedlings in no way resemble parents in vegetative characters.—*C. H. Connors.*

873. Crow, J. W. **Plant breeding from horticultural standpoints.** Ontario Dept. Agric. Ann. Rept. Agric. and Exp. Union **41**: 50–52. 1919.—Plant breeding work in the Department of Horticulture of the Ontario Agricultural College is briefly outlined, and the need of further work is emphasized.—*A. N. Wilcox.*

874. Crow, J. W. **Vegetable seed growing and breeding.** Amer. Soc. Hort. Sci. **1918**: 88–93. 1918.—The experience in growing and breeding vegetable seeds at the Ontario Agricultural College, and methods used there in growing and curing celery, carrot, parsnip, beet, and onion seeds are briefly outlined.—*A. N. Wilcox.*

875. Dalcq, Albert. **Note sur la spermatogénèse de l'Orvet. [Note on the spermatogenesis of the orvet.]** Compt. Rend. Soc. Biol. **83**: 1302–1304. Oct., 1920.

876. Daniel, Lucien. **Sur la stabilité et l'hérédité des Crataegomespilus et des Pirocydonia. [On the stability and heredity of Crataegomespilus and of Pirocydonia.]** Compt. Rend. Acad. Sci. Paris **169**: 513–515. 1919.—Daniel has grown 6 forms of chimera, or supposed chimera, none of which bore viable seeds.—(1) The two hawthorn-medlar chimeras of Bronvaux have been grown for over twenty years, and showed no reversions for about fifteen years.—(a) The form most like the medlar has borne twigs of hawthorn, of both chimeras, and twigs resembling medlar. These last, regrafted, gave chimeras again.—(b) The forms most like hawthorn has produced few twigs of hawthorn or of other forms.—(2) The two hawthorn-medlar chimeras of Saujon have been grown for about ten years.—(a) The form nearest the medlar produced some twigs resembling the medlar, but no twigs with spines.—(b) The form nearest the hawthorn bore some twigs of hawthorn, which, however, still showed some characteristics of the chimera.—(3) A pear-quince chimera has been grown for 7 years. It arose from the callus of a graft, is intermediate in its leaves, and can be grafted on either pear or quince. It has formed no flower-buds.—*John Belling.*

877. Daniel, Lucien. **Obtention d'une race nouvelle d'Asphodèle par l'action du climat marin. [The appearance of a new variety of Asphodelus through the action of the marine climate.]** Compt. Rend. Acad. Sci. Paris **170**: 1332–1333. 1920.

878. Doncaster, L. **Genetic studies in Drosophila.** [Rev. of: Morgan, T. H., C. B. Bridges, and A. H. Sturtevant. **Contributions to the genetics of Drosophila melanogaster.** *V + 388 p., 12 p.* Carnegie Inst. Washington, Publ. No. 278. Washington, 1919.] Nature **105**: 405–406. 1920.

879. Doncaster, L. **Mendelism.** [Rev. of: Punnett, R. C. **Mendelism. 5th ed.** *13 × 19 cm., XV + 219 p., 7 pl., 52 fig.* Macmillan and Co.: London, 1919.] Nature **104**: 655–656. 1920.—"One of the best introductory treatises on the modern study of genetics. We note with regret that the hypothesis of multiple allelomorphs is nowhere fully discussed." [See Bot. Abst. 6, Entry 714.]—*O. A. Stevens.*

880. Duarte d'Oliveira, José. **Sur la transmission de la fasciation et de la dichotomie a la suite de la greffe de deux vignes portugaises. [The transmission of fasciation and dichotomous branching through the grafting of two Portuguese varieties of grapes.]** Compt. Rend. Acad. Sci. Paris **170**: 615–616. 1920.—Scions of a Portuguese variety of grapes, Albino de Sauza, were grafted on stock of another variety, Goncalo Pires. The latter variety is characterized by dichotomous branching and the frequent production of fasciated branches. The former never exhibits these peculiarities. The grafts were made in March. The following June the author noted that the new growth from the scion showed the fasciations and dichotomous branching characteristic of the variety used as the stock and has since continued to exhibit these characteristics.—*C. B. Hutchinson.*

881. East, E. M. **Population.** Scientific Monthly 1920: 603–604. June, 1920.—The author discusses the question of population increase in relation to increase of food. He shows that present figures as to the world's population and food and their rates of increase are entirely in accord with the conclusion of Malthus. Discussing the increase by races, he concludes that the white race is increasing much more rapidly than either the yellow or black race. China is practically stationary as to population, India and the South Seas have a slow increase, and Japan has a high rate. The blacks are increasing only in this country, the number of negroes in Africa remaining practically stationary. On the other hand, all the white races except in France are increasing at fairly high rates. Wars, even one as great as the last, seem to have no appreciable effect on the upward march of population.—Turning to the United States, he shows that the law of diminishing returns has begun to apply to agriculture and he calls attention to the fact that future increase in agricultural production is definitely limited. To prevent the population of this country from crowding too closely on the means of subsistence he offers the following remedies: First, a restriction of immigration; second, education; third, equitable readjustment in many of our economic customs; and, last, natural marriage selection—a somewhat increased birth rate in families of high civic value, and among the rank and file a restriction of birth commensurate with family resources.—*Lowell J. Reed.*

882. Engledow, F. L. **Inheritance in barley. I. The lateral florets and the rachilla.** Jour. Genetics **10**: 93–108. *3 fig.* Aug., 1920.—Data are offered showing Mendelian segregation in F_2 generations of crosses between smooth and bristly rachillae. A one-factor difference is found. The problem of the inheritance of lateral florets is discussed and data bearing on its solution presented. Several forms of lateral floret differing either in fertility or shape and size of glume afford to this author instances of multiple allelomorphism. Histological study of the developing lateral florets at different stages is needed to correlate Mendelian characters with histological structures.—*F. P. Bussell.*

883. Faber, Harold. Foreword by Sir Robert Greig. **Forage crops in Denmark.** *ix + 100 p.* Longmans, Green & Co.: London, 1920.—See Bot. Abstracts 7, Entry 22.

884. Garber, R. J., and P. J. Olson. **A study of the relation of some morphological characters to lodging in cereals.** Jour. Amer. Soc. Agron. **11**: 173–186. *1 pl., 2 fig.* May, 1919.—Authors mention the perplexing problem of producing non-lodging small grains possessing high yielding capacity. In 1916 a project was organized to determine whether some simple morphological character is closely related to lodging or non-lodging. Extreme varieties for lodging in wheat, oats and barley were selected and study made of correlation between lodging behavior and average size of culm, average size of vascular bundles, average area of sclerenchyma, thickness of culm wall, length of lignified cells, and thickness of lignified cell wall. None of these characters except thickness of cell wall seems closely related to lodging. Lodging in cereals is dependent on so many factors of unequal value that no one factor seems correlated closely enough with lodging to be of much value as selection index. In oats and barley the average number of vascular bundles was found to be correlated with average diameter of culm.—*Geo. K. York.*

885. Gates, R. Ruggles. **Heredity and eugenics.** Eugenics Rev. **11**: 193–201; **12**: 1–13. 1920.—Summarizes with comments and some discussion recent research as bearing on human heredity under the main subjects of physical characters, mental characters, the limits of heredity and the eugenical, social and world aspects, with a bibliography of fifty numbers.—*H. J. Banker.*

886. Georgeson, C. C. **Summary of the work at the several stations.** Rept. Alaska Agric. Exp. Sta. **1917**: 5–33. *Pl. 1–2.* 1919.—The author describes some new varieties produced by crossing; and presents the results of variety and cultural tests of horticultural and farm crops; and also briefly discusses the value of various ornamental crops for Alaskan conditions.—*H. K. Hayes.*

887. Gersdorff, C. E. F. **Germination of gladiolus seed.** Flower Grower 7: 73. 1920. —A table shows the time required for germination, the percentage of germination and the percentage of corms harvested, based on 3261 seeds of various varieties and hybrids. Seeds were previously selected for plumpness. Sixty per cent of the total number of seeds germinated and thirty per cent yielded corms which were harvested. The time required for germination varied from sixteen to eighty-five days. Most of the seeds "should have germinated in thirty-one days."—The method of raising young corms from the seed is described.—*A. N. Wilcox.*

888. Gowen, John W. **Self-sterility and cross-sterility in the apple.** Maine Agric. Exp. Sta. Bull. 287. *61–88 p.* May, 1920.—Many varieties of apples are commonly self-sterile. Results are the same whether stigmas are pollinated from the same flower, a flower from another cluster or from another tree of the same variety. Of 12 varieties tested, 8 were wholly self-sterile; four—Baldwin, Wealthy, Duchess and Northern Spy—were, in slight degree, self-fertile, Duchess and Northern Spy being doubtfully so. Only 42 of a compiled list of 119 varieties that had been tested are known to have set self-fertilized fruits, and only 15 of these produced fruit in quantity. Varieties do not give the same results in all regions; those self-sterile in one state may be, in some degree, self-fertile in another. In a test of cross-fertility 43 combinations were tried; 20 of these proved compatible and formed fruit. The most successful combinations were Grimes Golden × Ben Davis, Baldwin × Golden Russet and Ben Davis × McIntosh. Of a list of 243 combinations of varieties, made up of tests in several states, 57 are recorded as not producing fruit and 186 as producing fruit. Cross compatibility of varieties can be determined only by trial. Yields of orchards of self-sterile varieties may be increased by introduction of other varieties. The number of good seeds in crossed apples is greater than in those which are selfed.—Causes of self-sterility are external and internal. The chief internal cause is the slowness of growth of the pollen tube in the selfed style as against that in the crossed style. Other internal causes are degenerate pollen and lack of proper development of ovule.—*C. S. Crandall.*

889. Guyer, M. F., and E. A. Smith. **Studies on cytolysins. II. Transmission of induced eye defects.** Jour. Exp. Zool. 31: 171–223. *4 pl., 7 fig.* Aug. 30, 1920.—Preparation of lens from eyes of rabbits, injected into peritoneal cavity of fowls, leads to formation of specific anti-body. Blood serum from fowls thus treated was injected into veins of pregnant rabbits. In a small proportion of cases, young were born with defective lenses and other eye defects. From young of one such brood five further generations with defective eyes have been propagated. Defects tend to increase rather than decrease in later generations. Defects are transmitted through males as well as females. They behave in some respects as a Mendelian recessive character. Although these six defective generations have all arisen from a single original treated female, full safeguards have been taken against possibility of having bred from a strain which chanced to carry eye defects of this sort, prior to any operative treatment. Also defective young born of an operated mother quite unrelated to the first stock are now being reared for test of heritability of the modifications in independent strain. One case is recorded in which normal appearing offspring of a treated mother gave rise to defective young. This is not in harmony with interpretation of transmission of induced defect as due to direct influence of defective organ upon germ-cells; *i.e.*, inheritance of an acquired character, *sensu stricto.* On the other hand, parallel induction theory is not in keeping with fact that germ-cells of originally-treated mother were in no case affected, but that only those of her offspring which were in utero at time of treatment were affected. Authors are not prepared to adopt definite theoretical interpretation.—*F. B. Sumner.*

890. Hammond, J. **On the relative growth and development of various breeds and crosses of cattle.** Jour. Agric. Sci. 10: 233–289. July, 1920.—Data from the Smithfield Club of fat stock exhibits at Islington 1893–1913 were studied to determine the average weights attained by different breeds, dressed weight of carcase, suet fat, gut fat, tongue, head, heart, tripe, hide, blood, intestine and unaccounted for. Similar data are presented for sex, age, and F_1 crosses between breeds. Individual variation is noted. Correlation between weight of one part

and that of another is indicated. Effect of selection over periods 1893–1899, 1900–1906, 1907–1913 and effect of season are discussed.—Steers are shown to weigh about 10 per cent more than heifers at the same age. About 77 per cent of steers' and 81 per cent of heifers' weight at 33 months old, is put on in the first 22 months. Steers have larger proportion of gut fat, head, hide, carcase; heifers a larger proportion of suet fat, tongue, tripe, intestine. Increasing age increases proportion of carcase, suet fat, gut fat; decreases proportion of tongue, head, heart, tripe, hide.—Cross-breeding showed no increase in weight over the heavier parent, where two heavy breeds are crossed, the F_1 is usually heavier than the mean of the two parents; where a heavy and light breed is crossed the F_1 is not so heavy as the mean of the parents either way the cross is made. Crossing tends to obliterate sexual differences. The general effect of cross-breeding is not, as has often been stated, to increase the rate of maturity in weight. Crosses give a slightly larger proportion of carcase, gut fat, tongue and heart than the pure breeds. The pure-breds are heavier in hide, head and blood.—The coefficient of variation of live weight ranged between 7.29 and 11.98. This coefficient decreased between 1893 and 1913. The coefficients of variation for steers 33 months old were, carcase 4.0; suet fat 20.4; gut fat 24.7; tongue 10.4; head 6.3; heart 12.5; tripe 15.8; hide 10.1; blood 17.2; intestine 21.8; unaccounted for 23.5.—*John W. Gowen.*

891. Hansen, W. **Die Pflanzenzüchterische Buchführung und Bewertung der Zuchtpflanzen. [Plant-breeding book-keeping and evaluation of the parent plants.]** Zeitschr. Pflanzenzücht. **6**: 119–138. *2 fig.* Dec., 1918.—The methods followed at the plant-breeding station of Eckendorf near Bielefeld, Germany, in the collection and recording of field data on breeding-plats with field crops are described in this article. The several observations may be grouped as follows: (a) pedigree work; (b) observations on growing plants, harvest data, and plans of selection plats; (c) notes taken during selection work; (d) behavior of the characters in the various strains and families; and (e) guide to working methods, diary of work performed, meteorological data, and germination tests.—Numerous specimen observation and breeding forms specially arranged for recording various data on the cereal grasses, legumes, and fibers, are included.—*H. M. Steece.*

892. H(arland), S. C. **The new theory of the origin of Sea Island cotton.** Agric. News (Barbados) **19**: 100–101. 1920.—"Facts suggest that Sea Island cotton originated from a natural cross between a glabrous, broad-leaved West Indian native, with botanical affinities to *G. brasiliense*, and some variety of American Upland." Author crossed a West Indian native cotton of this type with an American Upland and obtained an F_1 which was morphologically almost indistinguishable from Sea Island and had fine silky lint more than 40 mm. long. Several F_2 plants also resembled Sea Island. "Actual reconstruction of Sea Island cotton by this means has not been accomplished" but West Indian native type comprises many different strains. "Synthesis of Sea Island cotton could probably only be effected as a result of the segregation of some rare gametic combination."—*T. H. Kearney.*

893. Harrison, J. W. Heslop. **A preliminary study of the effects of administering ethyl alcohol to the lepidopterous insect Selenia bilunaria, with particular reference to the offspring.** Jour. Genetics **9**: 39–52. Dec., 1919.—High mortality resulted from raising this insect, from egg to adult, in alcohol fumes. The one male and four females that survived this treatment were crossed with controls. Offspring from these crosses (100 eggs used) were "greatly superior in several respects" to the controls; namely, in regard to viability of the eggs and larvae, rate of development, pupal weight, and vigor (shown by pigmentation). In spite of the small numbers, the author feels certain that these results are real, more especially since Pearl's work with fowls seems to offer support. Pearl's hypothesis of the selective effect of the alcohol treatment is explained at length.—*E. C. MacDowell.*

894. Harrison, J. W. Heslop. **The inheritance of melanism in the genus Tephrosia (Ectropis) with some consideration of the inconstancy of unit characters under crossing.** Jour. Genetics **10**: 61–86. *3 fig.* July, 1920.—In crosses within limits of species *T. crepuscularia*, inheritance of melanism proceeds on ordinary Mendelian lines. On the contrary, in

interspecific crosses between *T. crepuscularia* and *T. bistortata* a nondescript series of intergrades results in F_2 in respect to this same character. Thus, what behaves as a single unit character in one cross shows itself highly inconstant in another, owing, author believes, to "contamination of the gametes." This difference is intimately connected with inability of chromosomes in wider crosses to play their normal parts, owing to "incompatibility." If genetic factors may thus be modified by hybridization, possibility of their modification by other agents seems not excluded.—*F. B. Sumner.*

895. Hartman, Carl G. **The free-martin and its reciprocal: Opossum, man, dog.** Science **52**: 469–471. Nov. 12, 1920.—The author describes very briefly an intersexual opossum: "externally, normal penis, empty scrotum, small malformed pouch, head rather like that of a female; internally, reproductive organs distinctly of the female type, infantile in development, consisting of vaginal canals, uteri, Fallopian tubes, and small round bodies in the situation of the ovaries." These bodies consisted of a thin albuginea, and a mass of tubules of uniform size consisting apparently of Sertoli cells only.—The history of the specimen was not known. The author, arguing from analogy, interprets it as a "reciprocal free-martin"; *i.e.*, a sex-intergrade zygotically *male*, which in its ontogeny develops *female* characters. He points out the opportunity that exists in the crowded pregnant uterus of the opossum for anastomosis of foetal circulations, which might account for such a condition if the female of a fused pair developed sex hormones in advance of the male. Fusion of placentae has been observed in dog embryos by Evans; and Eschricht describes a case of fused placentae in a case of two-sexed human twins in which the male was similar to the opossum described above, and the female was normal. The principles involved are considered to throw much light on the entire subject of hermaphroditism in mammals.—*Frank R. Lillie.*

896. Hendrickson, H. C. **The selection of seed corn in Porto Rico.** Porto Rico Agric. Exp. Sta. Circ. 18. *22 p., 7 fig.* Sept. 2, 1920.—Intended as a practical guide to farmers. Contains no new methods. [See also Bot. Absts 7, Entry 614.]—*E. E. Barker.*

897. Henry, A. **Sports and varieties of trees: A new sport of the lime tree.** Gard. Chron. **68**: 180. Oct. 9, 1920.—A large secondary branch of *Tilia vulgaris* bore leaves which were white with rare patches of green. The white leaves yielded to alcohol less than one-twentieth of the chlorophyll found in normal leaves.—*John Belling.*

898. Herlant, Maurice. **L'acide carbonique comme agent de parthénogénèse experimentale chez l'oursin (Paracentrotus). [Carbonic acid as an agent of experimental parthenogenesis in the sea-urchin (Paracentrotus).]** Compt. Rend. Soc. Biol. **83**: 188–190. 1920.—Delage found eggs of sea-urchin, unlike those of starfish, were not activated by exposure for an hour to sea water saturated with carbon dioxide. Author obtains development in sea-urchin egg by exposing it to carbon dioxide one and one-half to two minutes, returning to sea water for 20 to 30 minutes, then putting into hypertonic solution equal time. He conceives first treatment to activate egg as whole, second to produce asters by which division is effected.—*A. Franklin Shull.*

899. Hovasse, R. **Le nombre des chromosomes chez les têtards parthénogénétiques de grenouille. [The number of chromosomes in parthenogenetic tadpoles of the frog.]** Compt. Rend. Acad. Sci. Paris **170**: 1211–1216. May, 1920.

900. Hume, A. N., M. Champlin, and M. Fowlds. **The influence of length of wheat heads on resulting crops.** South Dakota Agric. Sta. Bull. **187**: 139–158. 1919.—Twelve hundred plants of Bluestem wheat were grown under nearly identical conditions. From these, two hundred and sixty were selected, having as nearly as possible the same number of stools —the reason for this selection being that stooling differences should be eliminated as a factor, if possible. The length of the central head of each plant was measured. From each of those heads twenty seeds were selected at random and were planted at uniform spaces in individual head-rows. The yield of grain from each row was recorded and correlated with the length

of the mother head. A slight positive correlation ($r = 0.17 \pm 0.04$) was found.—Seed was preserved from these head-rows and was planted in similar rows the following year, and a correlation coefficient determined for yields of rows and length of the original mother heads. There was found to be no correlation in the second, third, fourth or fifth generations after the selection of the original mother heads.—These results show that the length of the central spike cannot be considered as an indicator of the relative yielding-ability of mother plants.—*A. N. Wilcox.*

901. Ibsen, Heman L. **Tricolor inheritance. IV. The triple allelomorphic series in guinea-pigs.** Genetics **4**: 597–606. Nov., 1919.—Presentation of data on 19 of the 21 possible matings corroborating theory of triple allelomorphism of complete (E), partial (e^p), and no (e) extension of black or chocolate pigment. Also data are given on litter size and sex ratio for the various matings. Departures from the expected ratios are found and explanations are suggested.—*P. W. Whiting.*

902. Jordan, Edwin O. **The differentiation of the paratyphoid enteritidis group.** Jour. Infectious Diseases **26**: 427–434. May, 1920.—Article is based on the results of 6 years' observation. A culture, isolated from human blood, supposedly paratyphoid-B type, at first gave typical cultural reactions (especially on sugars) and agglutination. Twelve colonies regrown from the plating of the original culture displayed varying characteristics in the fermentation of carbohydrates, end products, agglutination, and absorption of heterologous immune serum; this is shown in several tables. Author concludes that substrains differing from the parent strain are not only possible, but most frequent; this is proven both in vivo et in vitro.—The limits of variability were not determined.—*Andrew I. Dawson.*

903. Kalt, B. **Der Begriff "Originalsaatgut" und seine Anwendung bei der Züchtungsanerkennung. [The concept "Original seed" and its application in the recognition of breeding.)** Fühlings Landwirtsch. Zeit. **1919**: 460–471. 1919.—Much confusion is found concerning conceptions of "Original seed." That seed which is first offered for sale as the product of a well-planned system of breeding, and which is produced by the breeder or under his supervision is called "Original seed." Author emphasizes the need of organizations adopting uniform rules and regulations for the inspection and certification of such seed. [See also Bot. Absts. **7**, Entry 619.]—*C. M. Woodworth.*

904. Kniep, H. [German rev. of: Burger, Owen F. **Sexuality in Cunninghamella.** Bot. Gaz. **68**: 134–146. Aug., 1919. (See Bot. Absts. 3, Entry 2097.)] Zeitschr. Bot. **12**: 518–520. 1920.

905. Law, S. C. **An albino bulbul.** Avic. Mag. **11**: 111–112. July, 1920.—An albino specimen of the black Indian bulbul was found in a nest with another youngster of the usual color. According to the description and colored plate the albino was pure white and pink-eyed.—*Sarah V H. Jones.*

906. Lécaillon, A. **Sur la reproduction et le développement des bivoltins accidentels et de la première génération qui en dérive, chez le Bombyx du Mûrier. [On the production and development of accidental bivoltins and the first generation derived from them in the silkworm (Bombyx mori).]** Compt. Rend. Acad. Sci. **168**: 366–368. 1919.—The author has shown previously (Compt. Rend. **165**: 603 et 683, 1917), that accidental bivoltin eggs appearing in races of univoltins undergo a change of color from yellow to white, the embryos developing within ten days in place of ten months.—To study the history of accidental bivoltins further, the author selected five pairs of accidental bivoltin moths. These oviposited in the summer of 1917, the eggs hatching in the spring of 1918, simultaneously with eggs of univoltin parents oviposited two months earlier.—In the next generation, descendants differed with different females.—In one case, bivoltins were produced, in a second case, although eggs became white as with bivoltins, some eggs only hatched, eggs that failed to hatch becoming rose-color (arrested development). In a third case some eggs were univoltin and some

bivoltin, the latter hatching at once. Females of the fourth and fifth pair produced univoltins only. All bivoltin moths of 1918 produced yellow eggs which hatched in the spring of 1919.—Thus while in the typical univoltin race only one kind of egg exists, in the accidental bivoltins there are two kinds, summer eggs and winter eggs, the latter hibernating.—Accidental bivoltins, therefore, do not transmit wholly and immediately to all their descendants the aptitude to produce alternatingly summer and winter eggs, but to a certain number only. The new character appearing in bivoltins is not, therefore, represented by a mutation in the de Vriesian sense.—*Isabel McCracken.*

907. Lehmann, Ernst. **Neuere Oenotherenarbeiten. (Sammelreferat II). [New work with Oenothera. (Composite review).]** Zeitschr. Bot. **12**: 61–85. *14 fig.* 1920.—Paper is second of a series of composite reviews of the latest *Oenothera* literature, the first having appeared in 1917 (loc. cit., **10**: 517), and presents in an extended discussion amplified by original diagrams the work of Atkinson, Bartlett, Davis, Kranichfeld, Lotsy, Renner, and de Vries (1915–1920) in so far as the investigations of these authors throw new light upon the two chief questions:—(1) Is *Oe. Lamarckiana* a hybrid or a pure species? (2) How do mutations appear and thus build up new species in the genus *Oenothera?*—The following classification of recent investigations is also included: (1) de Vries, evidence obtained from crossing. (a) The establishment of the hypothesis of heterogamy; (b) Twin hybrids. (2) Honing, anatomical evidence upon the hybrid nature of *Oe. Lamarckiana.* (3) Heribert-Nilsson, the red-nerve factor and the impossibility of its existence in a homozygous condition. (4) Bartlett, mass-mutation in *Oe pratincola.* (5) Renner, sterile seed and selective pollen-tube growth. (6) Lutz, Gates, Stomps et al., chromosome counts in *gigas* and *lata* forms.—*Paul A. Warren.*

908. Linhart, G. A. **A new and simplified method for the statistical interpretation of biometrical data.** Univ. California Publ. Agric. Sci. **4**: 159–181. *12 fig.* 1920.—Graphic method of fitting Gaussian and Galton-McAlister frequency curves. Use of latter urged when deviations are large in comparison with mean.—*Raymond Pearl.*

909. Lippincott, Wm. A. **Improving mongrel farm flocks through selected standard-bred cockerels.** Kansas Agric. Sta. Bull. 223. *48 p., 30 fig.* Jan., 1920.—Four pens, ten each, of mongrel females were mated respectively with a standard-bred White Orpington male, a standard-bred Barred Plymouth Rock male, a standard-bred South Carolina White Leghorn male, and an unselected mongrel male. Standard-bred males in most cases had high-laying pedigree. In second year, offspring from these matings were again bred in same numbers to other males of same varieties. This was repeated with second generation. Decided improvement in laying qualities was obtained through the Plymouth Rock and White Leghorn males. Through the mongrel males nearly as good results were obtained. The White Orpington males produced no improvement. Latter is explained through lack of pedigree in standard-bred males. In all cases fair uniformity in type and color was obtained by the third generation through the standard-bred males. Laying records are given for those offspring only that were selected for mating.—*H. G. May.*

910. Little, C. C. **Note on the occurrence of a probable sex-linked lethal factor in mammals.** Amer. Nat. **54**: 457–460. Sept.-Oct., 1920.—The sex ratio of a highly inbred strain of Japanese waltzing mice, all descendants of one pair of individuals, was 53.2 ± 5.7, while that for inbred non-waltzing mice was 103.1 ± 2.8, a difference in the ratios of 7.9 times the probable error. Further expected results were obtained in the number of males resulting from reciprocal crosses of waltzing by non-waltzing stock. Data obtained from back-crosses of the lethal-carrying females on F_1's of normal by waltzing and the litter size of a pure strain of waltzing mice, were also in keeping with the assumed recessive sex-linked lethal. Preliminary report.—*Sarah VH. Jones.*

911. Little, C. C. **Factors influencing the growth of a transplantable tumor in mice.** Jour. Exp. Zool. **31**: 307–326. Oct. 5, 1920.—The tumor used in the experiments was found as a spontaneous growth in a strain of Japanese waltzing mice by Tyzzer. It had been

propagated by continued inoculation for 40 implant-generations, during seven years.—675 mice were used, of two kinds, common domestic mice of European strains, and animals which had one European parent and one F_1, European × Japanese, parent. It had been found previously that the susceptibility to the transplanted tumor of the Japanese parent was completely dominant in the F_1. Genetic analysis of the genes responsible for this difference in susceptibility will be published later. Author states presence of several factors necessary to produce susceptibility. Among animals of the F_1 × European class there is therefore great genotypic diversity. In this paper the whole F_1 × European class is treated statistically and its susceptibility compared to the pure European class. In this latter class 11.12 per cent of the observations made showed positive tumor-growth, in the F_1 × European class, 17.54 per cent of the observations were positive. In this class there was found a distinct difference in tolerance for tumor-growth between younger and older mice of female sex. Certain factors of the Japanese genotype must in some cases, even when separated, exert a favorable influence upon temporary growth of tumor. The Japanese strain, which was found to possess twelve to fourteen independent genes absent from European mice and favoring growth of a different tumor if present in combination was found to be remarkably pure. (The Japanese waltzer is a variety of the common Oriental domestic mouse, which is zoologically quite different from *Mus musculus* and is probably derived from *Mus wagneri* Ref.)—*A. L. Hagedoorn.*

912. Lloyd-Jones, O., and J. M. Evvard. **Studies on color in swine. I. The hereditary relationship of the black of the Hampshire and the red of the Duroc-Jersey.** Iowa Agric. Sta. Res. Bull. **53**: 203–208. 1919.—Authors point out that while the white of Yorkshires or Chester-Whites is completely dominant to the black of Berkshires or Poland-Chinas, a blue roan generally with a white belt results when a Hampshire (black with white belt) is crossed with a Chester-White. They also point out that while the Berkshires or Poland-Chin as crossed with red breeds (Duroc-Jerseys or Tamworths) give red animals with black patches, black animals sometimes having white belts are produced when Hampshires are crossed with Duroc-Jerseys. Evidence is also given to prove that in the last-mentioned cross black is a simple dominant.—*H. L. Ibsen.*

913. MacCurdy, H. M. **Division, nuclear reorganization and conjugation in Arcella vulgaris.** Michigan Acad. Sci. Ann. Rept. **21**: 111–113. 1919.—The number of daughter cells produced by a single individual is limited, and varies from none to twenty-seven. The members of a pair of ex-conjugants tend to produce the same number of daughter cells at about the same rate. In lines derived from a single individual, "depression" periods and conjugation occur at intervals of from four to six weeks; while some members of a line are depressed, others undergo conjugation. Individuals may pass successfully through a period of depression and enter upon a new period of division. Preparations of cells made during the time of depression show the vegetative nuclei inactive or breaking up, and "secondary" nuclei forming from part of the chromidial net. Preparations of conjugating individuals show remarkably similar conditions. In many cases, the secondary nuclei have been observed to enter daughter cells, while the old vegetative nuclei remain in the old shell. If the nuclei constitute the germ-plasm, its continuity is interrupted at the time the old vegetative nuclei cease to divide and begin to disintegrate, and the secondary nuclei are organized from the chromidial net and pass into the daughter cells. If chromidiogamy occurs at the time of conjugation, as is maintained, nuclear continuity is still interrupted, and is only secured in the process of construction of new nuclei out of the chromidial net. There is thus a discontinuity of nuclei with a nuclear cycle of development. If the nuclei are successively similar at corresponding stages, the lines run true; if not, variations due to their dissimilarities are produced.—*Bertram G. Smith.*

914. Macoun, W. T., and M. B. Davis. **Progress in apple breeding for the Canadian prairies.** Proc. Amer. Soc. Hort. Sci. **1919**: 13–18. 1919.—The Canadian prairies are situated between 49° and 53° north latitude and between 97° and 114° west longitude. Altitudes range from 700 feet to 4200 feet. Spring is early; buds swell in April. Summers are rela-

tively warm. Winter begins the last of October and winter temperatures are sometimes —40° to —50° or lower. The most trying times for trees are (1) Spring; severe frosts after buds swell are frequent and kill all growth. (2) Late autumn or early winter when trees are badly frozen while foliage is still on. (3) Winter. Long-continued spells of severe cold. All these factors require closer investigation. It has been found difficult and practically impossible over most of the area to bring commercial varieties of apples to bearing age.—For the past 30 years many varieties have been tested at Experiment Stations and by individuals in Manitoba, Saskatchewan and Alberta, but few trees have borne and, when they have, they have not lived long afterwards. Seedlings of *Pyrus baccata* from seeds obtained in Russia were distributed to Brandon, Manitoba, and Indian Head, Saskatchewan, in 1890. These proved hardy and fruited well in 1894. Crossing in the hope of increasing size and quality while still retaining hardiness was begun in 1894. With *Pyrus baccata* and *Pyrus prunifolia* as pistillate parents and 21 varieties as pollen parents, 800 seedlings were grown from the crosses. These were distributed in 1902 to various places at altitudes from 740 to 4200 feet. At the lower elevations in southern Manitoba most of the trees proved hardy and, had the fruit been larger, would have been satisfactory; but at higher altitudes only two of the 17 best proved hardy in exposed places. These two are named Columbia and Osman. Columbia is from the cross *Pyrus baccata* × Broad Green, a summer Russian variety. Osman is from the cross *Pyrus baccata* × Osimoe, which is also a Russian variety ripening in August. In 1904 Dr. Saunders recrossed the best of the first generation crosses, using 18 varieties of apples, still with the hope of increasing size and quality and retaining hardiness. There were 407 trees obtained from these second crosses the first of which fruited in 1910. Most of the trees were grown at Ottawa and fruits have been described from 223 of them. The fruit of 171 or 76.68 per cent was under two inches in diameter, or little or no larger than fruit from F_1 crosses. The fruit of 48 or 21.52 per cent was between 2 and 2¼ inches and three bore fruits between 2¼ and 2½ inches. One bore fruit 2.62 inches in diameter. Fruits of most second generation crosses have long slender stems, thin tender skin and the crisp breaking flesh characteristic of crabs. From the very few F_1 generation which proved hardy under the most trying conditions, it is doubtful if any second generation seedlings will prove hardy in the high altitudes, but several have fruited at Morden, Manitoba, and it is hoped that some of them will extend the area over which apples may be grown.—Details are given of some of the second generation crosses and it is shown that Pioneer (*Pyrus baccata* × Tetofsky) × McIntosh gives a higher percentage of comparatively large apples and higher percentages of fruit of good quality and high color than when Ontario, Northern Spy, or Cranberry Pippin are used as pollen parents.—Results lead to the conclusion that in breeding for quality it is necessary to choose as one of the parents a variety possessing the desired character developed to the highest possible perfection. From experience to date, production of varieties hardy enough to survive the test of the Canadian prairies, by methods thus far used is regarded as doubtful. It is proposed in future work to use *Pyrus baccata* as the male rather than as the female parent as it is believed a large percentage of the F_1 crosses will be apples of marketable size and at least a few of them may prove hardy.—*C. S. Crandall.*

915. Marshall, F. R. **Some experiences in breeding range sheep.** National Wool Grower 8: 35–37. Jan., 1918.—A description of some of the work of the Bureau of Animal Industry at Laramie, Wyoming. Comparison is made of the lambing and shearing records of Rambouillet, Lincoln-Merino crossbreds and Corriedales under range conditions. The records indicate that very fine wool is usually associated with shorter staple and lighter fleece.—*G. F. Finlay.*

916. McEwen, Geo. F., and Ellis, L. Michael. **The functional relation of one variable to each of a number of correlated variables determined by a method of successive approximation to group averages: A contribution to statistical methods.** Proc. Amer. Acad. Arts Sci. 55: 95–133. Dec., 1919.—The authors attempt to develop a method of multiple regression independent of any assumption as to form of regression lines. Material is grouped with respect to each independent variable, and simultaneous equations formed expressing group

averages of dependent variables when all but one independent variable are held constant. These equations may be solved directly, but authors prefer method of successive approximation. Corrections are also obtained for variability within the group.—*John Rice Miner.*

917. Meunissier, A. **Observations faites à Verrières par Philippe de Vilmorin, sur le caractère "Hile noir" chez le pois. [Observations made at Verrières by Philippe de Vilmorin on the character "black-eye" in the pea.]** Jour. Genetics **10**: 53–60. July, 1920.—Most peas have seeds with uncolored hilums or "eyes." Several varieties of black-eyed peas are described. Black-eye × "white-eye" gives black-eye in F_1 and 3 black-eye: 1 white-eye in F_2 (Tschermak and Vilmorin). Exceptional results sometimes obtained, such as some black-eyed progeny from crosses between two white-eyed varieties. Occurrence of plants from such crosses with both black-eyed and white-eyed seeds in same pod or on same plant. Accidental crossing responsible for some cases, but not when both kinds are on same plant. A cross between uncolored seed-coats × garnet (reddish brown) seed-coats, produced in about the F_5 generation a few seeds with purple seed-coats (fluctuating unfixable character). Three years later this purple-seed-coat race produced black- and "white-eyed" peas on the same plants. Association of purple and "garnet" in same seed-coat gives appearance of black. Purple seed-coat color and black eye tend to be genetically associated in some peculiar manner. Tables showing observations given. Totals show 615 black-eyed seeds gave 407 progeny with violet seeds to 208 plants with non-violet seeds; 562 white-eyed seeds produced by the same plants from which the 615 black-eyed seeds came, gave 58 progeny with violet seeds to 504 with non-violet seeds.—*Orland E. White.*

918. Meunissier, A. **De quelques idées sur la selection des légumes. [Some ideas on the selection of vegetables.]** Rev. Hort. **91**: 300–303. June, 1919.—Popular discussion of pure lines, genotypes, phenotypes, and modern ideas of selection in relation to horticulture.—*Orland E. White.*

919. Morgan, T. H. **Castration of hen-feathered Campines.** Proc. Soc. Exp. Biol. Med. **17**: 70. 1920.—The results were the same as with hen-feathered Seabrights; namely, the development of male plumage following the operation.—*H. D. Goodale.*

920. Morgan, T. H. **The endocrine secretion of hen-feathered fowls.** Endocrinology **4**: 381–385. *5 fig.* July–Sept., 1920.—A restatement of the author's findings that in Seabrights, and Campines, the hen-feathered condition depends upon the presence of luteal cells both in the ovary and testes.—*H. D. Goodale.*

921. Morgan, T. H. **Whitman's work on the evolution of the group of pigeons.** [Rev. of: Whitman, Charles Otis, 1919. **Posthumous works of, edited by Oscar Riddle.** Carnegie Inst. Publ. No. 257. 3 vol.] Science **51**: 73–80. Jan. 23, 1920.—Reviewer finds no real contradictions between the results of Whitman, or even his interpretations, and the idea of discontinuity or mutation. Unit characters, when their development and manifestations are interpreted from the standpoint of chemistry, need not be so absurd as Whitman conceived them to be. Since any or all steps in ontogeny may be modified by a single factor, Whitman seems to have put undue emphasis upon ontogenetic development in his interpretation of phylogenetic relationships.—*H. G. May.*

922. Nevens, W. B. **Breed and size of cows as factors affecting the economy of milk production.** Jour. Dairy Sci. **2**: 99–107. *3 fig.* 1919.—A ratio, based on the geometrical theorem that the surface of two solids of similar shape are to each other as the squares of the cubes of their weights, is worked out to show the relation between the maintenance requirements of animals of different weights. Thus the maintenance requirements of a cow of known weight being available, the maintenance requirements of cows of any known weight may be calculated.—A study of the records, weights and feed consumption of the cows used in the Wisconsin cow competition indicates that the larger cows of the Holstein, Guernsey and Jersey breeds consumed less feed in proportion to size than did the smaller cows. Also the

larger cows were more economical producers than the smaller cows. The Holsteins of the heaviest class produced 29.2 pounds more milk for each 100 feed-units than did the Holsteins of the lightest class, while the largest Guernseys produced 20.5 pounds more milk than the lightest class, and the heaviest-class Jerseys produced 21 pounds more milk per 100 feed-units consumed than the lightest class. The larger animals are also shown to be more economical producers of total solids and butter-fat than the smaller animals.—The Holsteins in this contest were the most efficient producers of milk and total solids, while the Guernseys and Jerseys were the most efficient producers of butter-fat.—*R. R. Graves.*

923. Onslow, H. **Inheritance of wing colour in Lepidoptera IV. Melanism in Boarnia abietaria.** Jour. Genetics **10**: 135–140. *1 pl.* Aug., 1920.—Inheritance of melanism was previously described by author in related species,—*Tephrosia consonaria* and *Bosnaria consortaria.* These three species are confined to Kent and Surrey (with another melanic variety *Tephrosia extensaria* (*luridata*)). [Onslow, Jour. of Genetics, **9**: 53, 339. Dec. 1919, Mar. 1920.] In melanic form has wings of female uniform velvety black, of male, slightly browner, distal streak and veins traced in deeper black, otherwise unmarked. Type strain varies in color and markings from very dark to golden brown. Females slightly darker than males.—Character of matings made: *Melanic* × *melanic,* where one parent at least was homozygous (DD × DD (DR); melanic × melanic where both parents were heterozygotes (DR × DR); melanic × type where melanic parent was homozygous (DD × RR); melanic × type where melanic parent was heterozygous (DR × RR). In each of these crosses the melanic parent behaves as a simple Mendelian dominant to type forms. In a certain brood from melanic × type, the male parent being comparatively very light, light offspring and melanics appeared in equal numbers as expected, the light offspring appearing lighter than in other strains but not so light as male parent.—Results in agreement with conclusions of Bowers (Ent. Rec. **11**: 82, 1899), and Stallman (Ent. Rec. **28**: 21, 1916) in experimental breeding of melanics.—*Isabel McCracken.*

924. [Pearson, Karl.] **Peccavimus.** Biometrika **12**: 259–281. Nov., 1919.—This paper cites certain errors which have crept into publications of biometrical formulae. The corrections are indicated.—*John W. Gowen.*

925. Pennypacker, J. Y. **Observations on the beach plum. A study in plant variation.** Contrib. Bot. Lab. Univ. Pennsylvania **4**: 231–270. *Pl. 66–70.* 1920.—Author is impressed with marked variation in the beach plum (*Prunus maritima*) and suggests that this species is undergoing mutational variation along several lines due to environmental factors. Primitive color is supposed to have been greenish yellow or red. Through transformation of chloroplastids to chromoplastids pure yellow fruits arose along one evolutionary line. Development of purple and then blue considered another line. Reference is made to Burbank's hybridization work with *P. maritima.* Detailed description is given of nine varieties of the species of interest especially to taxonomists.—*James P. Kelly.*

926. Pridham, J. T. **Breeding cereals at the experiment farms.** Agric. Gaz. New South Wales **31**: 697–698. 1920.—Summary is given of plant-breeding work and nursery trials at several of the experimental farms.—*L. R. Waldron.*

927. Punnett, R. C. **The early elimination of surplus cockerels.** Jour. Bd. Agric., London **25**: 1319–1323. *1 fig.* 1919.—Author shows how appropriate crosses of races of poultry, involving sex-linked factors which manifest themselves in the down, make it possible to distinguish the sex of the offspring at hatching. Suggests possible practical applications.—*William A. Lippincott.*

928. Richardson, C. W. **Some notes on Fragaria.** Jour. Genetics **10**: 39–46. *2 fig.* July, 1920. The work is a continuation of that published in the same Journal **3**: No. 3, 1914, and **7**: No. 3, 1918. [See Bot. Absts. 2, Entry 494.] The results of certain crosses are given with regard to the inheritance of flower color, double flowering, shape of foliage, variegation in

foliage, fruit flavors, size of fruit, runners and sex. Pink flowers and doubleness were found to be dominant over white flowers and singleness. Because of its heterozygous condition with regard to leaf shape *Fragaria grandiflora* is considered to be a hybrid of *F. chiloensis* or *chinensis* and *virginiana*. Crosses of ♀ × ♂ or ☿ have thus far given 203 ♀ and 173 ♂ or ☿.—*W. D. Valleau.*

929. Richey, Frederick D. **The inequality of reciprocal corn crosses.** Jour. Amer. Soc. Agron. **12**: 186–196. 1920.—Reciprocal crosses between varieties or strains of maize are sometimes unequal. Possible causes of such inequalities are suggested as a difference in the food materials furnished the young plants by the different maternal parents and a difference in germinal reactions with different cytoplasms. The experiments show that some type of sex-linked inheritance must at least be considered as a possible cause of inequality between reciprocal maize crosses, by the unequal transmission from No. 199 as staminate and as pistillate parent.—*F. M. Schertz.*

930. Riebesell, P. **Einige zahlenkritische Bemerkungen zu den Mendelschen Regeln. [Some remarks critical of ratios in Mendelian inheritance.]** Biol. Zentralbl. **38**: 329–340. Aug., 1918.—An investigation of the criteria for goodness of fit of theoretical Mendelian ratios to be observed. On any given hypothesis as to relation of hereditary factors to external characters, number of factors may be found by mathematical process. Thus if one character occurs only with presence of all factors, equation will be: $\frac{3^m}{4^m - 3^m} = \frac{n_1}{n_2}$ where m = number of factors, n_1 and n_2 = observed frequencies of alternate characters, whence $m = \frac{\log n - \log n_1}{\log 4 - \log 3}$ $(n = n_1 + n_2)$. The probability of two hypothetic ratios may be compared in several ways: (1) by their deviation from the observed; (2) by the ratios of these deviations to their standard deviation; (3) by the probabilities that the theoretical ratios shall be found in a population in which the observed ratio has occurred; (4) by the ratio of the probability of the observed to that of the most probable value; (5) by the probability of a deviation as great as or greater than that of the observed from the theoretical. For small numbers of observations no one ratio can be picked out as the only likely one. All criteria depend on assumption of Gaussian distribution, which is violated by hypothesis of linkage and other extensions of Mendelian theory. Where more than one hypothesis is admitted by criteria, ratios in F_2 will often determine right hypothesis.—*John Rice Miner.*

931. Salaman, R. N. **The technique of cross-fertilization in potatoes.** Potato Mag. **3**: 8, 12, 26. *1 fig.* 1920.—Brief description is made of female and male organs of potato flowers and difficulties encountered in cross-fertilizing are mentioned. Instruments and materials required in crossing are given and the various operations of selecting buds, sterilizing, emasculating, labeling, covering, pollinating, protecting seed in field, harvesting and extracting seed, sowing seed and growing seedlings are described in detail. A simple and less certain method is also described as well as operations required in self-fertilizing. Successful fertilizations are never more than 5 per cent of individual blossoms treated.—*Richard Wellington.*

932. Salaman, R. N., and J. W. Lesley. **Genetic studies in potatoes. The inheritance of an abnormal haulm type.** Jour. Genetics **10**: 21–38. *4 pl.* July, 1920.—Two distinct types of potato stems were found and named respectively "prostrate" and "procumbent." The former differed mainly from the normal in that the stems were either deficient or entirely wanting in interfascicular secondary growth, consisting mostly of xylem, and in that upright habit of growth was absent. The latter seemed to be an intermediate between "prostrate" and "upright" varieties, as it resembled the "prostrate" in stem structure and the "upright" in growth habit. In a study of the inheritance of the "prostrate" habit, it was found to behave as a recessive character, the ratios indicating that it differed from the "upright" in at least two and probably three factors. No correlation was found between the "prostrate" habit and other characters.—*Richard Wellington.*

933. Salmon, E. S. **On forms of the hop (Humulus lupulus L., and H. americanus Nutt.) resistant to mildew (Sphaerotheca humuli (D. C.) Burr.).** IV. Ann. Appl. Biol. 6: 293–310. 1920.—In continuation of studies previously published the author now reports three groups of hop plants immune or resistant to hop mildew (*S. humuli*). Group 1 comprises several forms of a variety having yellowish-green leaves and known as the "Golden Hop." A female form is immune and a male form is susceptible to the attacks of mildew both when grown in a greenhouse and in the open. Another female form of this type is slightly susceptible to this fungus in the greenhouse only.—Group 2 comprises individual seedlings of the wild hop (*H. lupulus*) raised from seed obtained from Vittorio, Italy. Certain individuals proved to be immune, others highly susceptible to mildew. It is stated that the seedlings which are immune when grown in the greenhouse may, when grown in the open, show susceptibility, which as a rule is slight. The conclusion is drawn that different seedlings have distinctive physiological or constitutional characters, which are constant under the same environment and confer immunity or susceptibility upon the respective seedlings.—Group 3 comprises a male form of *H. americanus* which is immune to mildrew when grown in a greenhouse. Under the same conditions several American cultivated varieties proved susceptible.—*W. W. Stockberger.*

934. Skupienski, F.-X. **Sur la sexualité chez les Champignons Myxomycètes. [On sexuality in the Myxomycetes.]** Compt. Rend. Acad. Sci. 167: 31. July, 1918.

935. Slocum, Rob R. **Selection and care of poultry breeding stock.** Bur. Anim. Ind., Farmers Bull. 1116. *10 p., 6 fig.* 1920.—Practical suggestions concerning management of a breeding stock.—*William A. Lippincott.*

936. Slonaker, James R. **Some morphological changes for adaptation in the mole.** Jour. Morphol. 34: 335–372. *4 pl.* 1920.—In adaptation to fossorial habits, the sternum, pectoral girdle and fore-limbs of the American mole, *Scalops aquaticus*, have been greatly enlarged and modified, thus increasing the size of the anterior part of the body. To allow the enlarged anterior part of the body to pass the posterior part when the animal turns in its burrow, the pelvic girdle has been very much reduced in diameter. The reduction in the size of the pelvis has so narrowed the pelvic outlet that it is impossible for the urogenital and alimentary tracts to pass through it and still function; this necessitates their passage outside the bony arch—a condition very unusual in mammals. The eyes are so degenerate that they are doubtless able to function only in perceiving the difference between light and darkness. To compensate for the deficiency in sight, special tactile organs have been developed on the snout and on the margins of the fore-feet.—*Bertram G. Smith.*

937. Steinach, E. **Verjüngung durch experimentelle Neubelebung der Alternden Pubertätsdrüse. [Rejuvenation through experimental revitilization of the senile sex glands.]** *68 p., 9 pl.* Julius Springer: Berlin, 1920.

938. Thomson, J. A. **Modern study of heredity.** [Rev. of: Morgan, Thomas Hunt. **The physical basis of heredity.** *14 × 21 cm., 300 p., 117 fig.* J. B. Lippincott Co.: Philadelphia, 1919. (See Bot. Absts. 5, Entry 422.) Jour. Roy. Microsc. Soc. 1920: 354–357. Sept., 1920.

939. Tischler, G. **Ueber die sogenannten "Erbsubstanzen" und ihre Lokalisation in der Pflanzenzelle. [On the so-called hereditary substances and their localization in the plant cell.]** Biol. Zentralbl. 40: 15–28. 1920.—Resumé of literature on composition and behavior of chromosomes in relation to their function as bearers of Mendelian hereditary factors. Discussion of their chemical composition, cytological behavior and their rôle in heredity.—*E. G. Anderson.*

940. van de Weyer, W. **Hybrid Buddleias.** Gard. Chron. 68: 181. *1 fig.* Oct. 9, 1920.—An account of hybrids of *B. globosa* with *B. variabilis magnifica*, and with *B. Madagascariensis*. Segregations as to foliage, color, seed characters, fertility and fragrance are briefly indicated.—*J. M. Shull.*

941. Whipple, O. B. **Line selection work with potatoes.** Jour. Agric. Res. **19**: 543–573. Sept., 1920.—Data are given on the performance of numerous hill selections made within the Russet Burbank, Rural New Yorker, Green Mountain, and Early Six Weeks potato varieties. The results show that selection is practically valueless in isolating high-yielding strains except during the first season. No definite correlation was found between number of tubers produced per plant and yield in pounds, but high-yielding plants were usually correlated with vigor and health. From the commercial standpoint, the results demonstrate the value of making selections each season and of using vigor and health as an index of productiveness.—*Richard Wellington.*

942. Wister, John C. **Notes on the history of the bearded iris.** Jour. New York Bot. Gard. **21**: 181–191. Oct., 1920.—A historical sketch of the various *Iris* breeders from the earliest recorded work to present time. All varieties cultivated prior to 1890 or 1900 were derived from two species, *I. pallida* and *I. variegata.*—*J. Marion Shull.*

943. Yasui, Kono. **Genetical studies in Portulaca grandiflora.** Bot. Mag. Tokyo **34**: 55–65. *1 pl., 1 fig.* 1920.—The author describes crosses between single and double races belonging to 7 color types. Doubleness is dominant. Yellow is due to a yellow flavone derivative, which in the presence of a reducing factor (*R*) yields a magenta anthocyanin. White races lack either the chromogen factor (*C*) alone or both (*C*) and (*R*). Yellow single by white single (*CCrr* × *ccRR*) gives magenta F_1 (*CcRr*) and F_2 by selfing of 9 magenta, 3 yellow, and 4 white. Hybrid double magentas (*CcRrDd*) by white singles (*ccRRdd*) give magenta doubles, magenta singles, white doubles, and white singles in equal numbers. By yellow single they give equal numbers of yellow and magenta (*CcRrDd* × *CCrrdd* = 1*CCRrDd* : 1*CcRrDd* : 1*CCRrdd* : 1*CcRrdd* : 1*CCrrDd* : 1*CcrrDd* : 1*CCrrdd* : 1*Ccrrdd*). Double whites (*CcRrDd*) by pale yellow singles (*CCrrdd*) give equal numbers of magenta and yellow doubles and singles. Single scarlet by double white gives magenta double, which mated to single white gives equal numbers of magenta and white doubles and singles. The selfed singles from this give singles only; the selfed doubles, 3 doubles to 1 single. The singles mated to the doubles give 1 : 1 ratio.—*L. L. Burlingame.*

HORTICULTURE

J. H. Gourley, *Editor*

FRUITS AND GENERAL HORTICULTURE

944. Findlay, Hugh. **The handbook for practical farmers.** *558 p., 258 fig.* D. Appleton & Company: New York and London, 1920.—See Bot. Absts. 7, Entry 609.

945. Alderman, W. H. **The status of orchard fertilization experiments.** Proc. Amer. Soc. Hort. Sci. **16**: 109–113. (1919) 1920.—Attention is drawn to the fact that the orchard fertilization work during the past 30 years in about 30 different experiment stations in this country has all been carried on in about the same general way. The information obtained up to the present time about which there is little contention narrows down to about four general headings; namely, (1) there are many apple orchards, growing under a wide range of conditions which do not respond to any fertilizer; (2) orchards in sod are most likely to respond to fertilizers; (3) starved orchards give a ready response to fertilization; and (4) nitrogen in a readily available form seems to be the only element of plant-food that is uniformly a factor in the favorable responses—when such are secured. The author states, "We may readily see and safely say that a normal plant probably has a definite arrangement of conditions within itself, which fit into its functions of growth and fruitage or reproduction. It is when the arrangement is distributed that we get reduced vigor, feeble growth or lack of productiveness." He suggests that either pruning, cultural methods, fertilization, or some combination of all of these may restore the normal optimum in the plant and produce the results desired. Instead of a fertilizer problem, the problem may be one of pruning or cultural practices, or a

combination of all. He suggests that we look into the inside of the tree rather than into the soil or other external factors. In other words, we should attempt to diagnose the trouble, and then make an attempt to discover a treatment for it. This means a need of men trained in physiology and chemistry, and of considerable laboratory work under more controlled conditions. It is suggested that, to start with, we should eliminate the error introduced by miscellaneous stocks and scions; and the writer suggests that buds or scions from a single parent tree should be worked upon root stocks, developed by cuttings or other asexual propagation from a single parent plant. It is suggested that in place of a "fertilizer project" we should have a "nutrition project," and that most of the old type of fertilizer experiments should be carried on as demonstrations by extension workers.—*E. C. Auchter.*

946. Allen, W. J. **Three new varieties of plums.** Agric. Gaz. New South Wales **31**: 744–745. 1920.—Two new local seedling varieties, Higgins' Seedling and Wilson's Seedling, are described; also Tucker's Beauty, originated by Luther Burbank, is described. The two local seedlings are of the cherry-plum type.—*L. R. Waldron.*

947. Allen, W. J., and R. G. Bartlett. **Spring work for the banana grower.** Agric. Gaz. New South Wales **31**: 738–743. 1920.—Practical instructions are given covering selection of suckers, thickness and depth of planting, pruning, and depth of cultivation.—*L. R. Waldron.*

948. Anonymous. **Original description of the Turley apple.** Proc. Amer. Pomol. Soc. **1917**: 27. *1 pl.* 1918.—The Turley apple, a seedling of the Winesap, was originated in 1900 in Lawrence County, Indiana, by Joe A. Burton, Mitchell, Indiana. A detailed description of the apple is given.—*E. C. Auchter.*

949. Anonymous. **Espaco entre coqueiros.** [**Space between coconuts.**] Bol. Agric. Nova Goa [Portuguese East India] **1**: 17–19. 1919.—Considers the proper spacing of coconut palms for best results.—*John A. Stevenson.*

950. Anonymous. **Formacion del olivo.** [**Shaping the olive tree.**] Informacion Agric. [Madrid] **10**: 148–149. *3 fig.* 1920.—Describes a method of pruning young olive trees to give the desired shape.—*John A. Stevenson.*

951. Anonymous. **Grafting the mangosteen by inarching.** Missouri Bot. Gard. Bull. **8**: 61–63. 1920.

952. Anonymous. **The elements of hardy fruit culture.** [Rev. of: Staward, R. **Practical hardy fruit culture.** *216 p.* Swarthmore Press: London, 1920.] Nature **105**: 545. 1920.

953. Anthony, R. D. **Methods of interpreting results in orchard fertilizer experiments.** Proc. Amer. Soc. Hortic. Sci. **16**: 113–117 (1919) 1920.—It is shown that many of our fertilizer experiments were planned and laid out before there was much published information on the subject. As a result, many errors were made in planning the experiments and in interpreting the results. Some points which should be noted and studied are the following: (a) Weighted results are often given without giving the methods of deriving these or the original values. (b) If four-year overlapping averages were used it would tend to smooth the yield curves and make it easier to compare the records of different plots. (c) the cultural treatment of the orchard is not always given. (d) A strip of sod in the tree rows of cultivated orchards should be noted. (e) The contour of the land is not always given. (f) Not only should checks be repeated, but often the different treatments. (g) Soil variations should be recorded. (h) Cross-feeding should be prevented or acknowledged. (i) The performance of a single element cannot always be determined by subtracting the performance of a two-element plot from a three-element one. (j) There is a big variation in individual-tree performance. (k) We must not make too wide an application of a single fertilizer experiment even in the same country. (l) To find out how much variation there is between plots, without any fer-

tilizer treatments, it would be well to keep yield records for two or, even better, three years on the different plots before applying the fertilizer. It is stated that the partial failure of some of the early experiments should not discourage the continuance of such a fundamental line of investigation, and that pomological research will be improved by the passing out of the old types of fertilizer experiment.—*E. C. Auchter.*

954. Auchter, E. C. **Some influences of thinning, pollination, and fruit spur growth on the yearly performance record of fruit spurs and on the size of fruit produced.** Proc. Amer. Soc. Hort. Sci. **16:** 118–131. (1919) 1920.—Investigations in apple thinning, pollination, and fruit-spur growth were carried on from 1912 to 1919, inclusive, at the West Virginia Experiment Station. Results of the studies were as follows: (1) Apple-thinning experiments, carried on from 1912 to 1919, inclusive, show that neither the tree as a whole nor the individual fruit spurs are influenced by the removal of part of the crop so that the tree or spurs bloom again the following season. Fruit thinning, then, does not affect the annual bearing of apple trees.—(2) The size of the individual specimens left on the tree after thinning is greatly increased during the same year as a result of the removal by thinning of part of the crop. More marketable fruit is produced by the thinned trees and increased size of each apple in cases where the trees are bearing a good crop of fruit. This influence on size is lessened or lost altogether when trees are bearing light crops.—(3) The spurs on certain varieties of apples bloom more regularly than those of other varieties, but this does not mean that such spurs and varieties bear more regularly. A more likely explanation, with reference to fruit spurs only, of why certain varieties are annual bearers, is given in Nos. 7 and 8.—(4) Spurs which set fruit one year, generally do not blossom the next year.—(5) Spurs which blossom one year but do not set fruit, often blossom the next year. Others do not however.—(6) These results indicate for the varieties studied that the spurs, which blossom two years in succession make a greater yearly growth, have more leaves and a greater total leaf area in the year preceding the second successive blooming year. Such spurs have a greater total length and thus all indications show that they are more vigorous. Thus growth and vigor to a certain degree do not oppose, but rather encourage, fruitfulness.—(7) These results indicate that a variety is not an annual bearer because the same spurs bear in succession. They indicate that either a certain percentage of the total spurs on such varieties do not bloom in the heavy crop year and thus such spurs bloom and set fruit in the next year, or if all the spurs do bloom, a certain percentage of the spurs do not set and thus more readily bloom and set the next year.—(8) These results suggest that probably a larger proportion of the spurs on the biennial bearers not only bloom, but also set fruit in the crop year. Such spurs then do not readily bloom the next year. Observation shows that trees bearing heavy crops make very little spur growth during such years. We would expect then from No. 6 that very few spurs on such trees would bloom the following year. If greater spur growth was secured on the annual bearing varieties, then, a greater proportion of spurs would bloom in the off year, especially the non-blooming spurs of the year before.—(9) Certain varieties which produce fruit yearly, form fruit buds terminally and laterally on one year old growths to such an extent that the production of fruit from these sources is often enough to class a variety as an annual bearer without reference to its fruit spurs. It is also possible that some varieties produce a higher percentage of fruit spurs yearly than do others, and as these gradually form fruit buds, some annual fruit may be produced. However, there are many so-called annual bearers that do not produce fruit by any of these methods and a more reasonable explanation of their annual bearing is given in Nos. 7 and 8.—(10) If the statements under Nos. 7 and 8 finally prove to be justified in later work, then the whole problem of biennial and annual bearing appears to be affected to a degree by the sterility and pollination problem and is not one of growth and nutrition only.—(11) It may be possible to break up the biennial bearing of certain varieties of apples either by altering certain cultural, fertilizer, or pruning methods as suggested by different investigators, and after seeing what light certain pollination studies may throw on the problem, but at this time, we have no definite information to offer on this point, based upon investigational work of this station.—(12) There appears to be a good correlation between the weight of the indi-

vidual apples produced on a tree and the weight on seeds in each fruit. Since the number of good seeds and weight of seeds are correlated, this correlation would probably hold between weight of fruit and number of good seeds.—(13) Weather, including temperature, wind, sunshine, etc., exerts a marked influence, through its effect on the length of the blooming period, light and bee activity, on the number of good seeds and the weight of seeds in individual apples on a tree. More good seeds and a greater weight are produced in warm sunny seasons when the pistils are more receptive and the bees can work longer and more effectively.—(14) With the same crops per tree and the same cultural practices, thus keeping good vigorous spurs, the size of the individual apples of a tree should be larger in those seasons which have good weather at pollination time.—(15) If the crops per tree are much larger in certain seasons than others, then the fruit will not be larger, even though there are more good seeds and a greater weight of seeds. The correlation between weight of seeds and weight of individual apples will hold true, however, in each of the separate years.—*E. C. Auchter.*

955. Balme, Juan. **El frambueso y su cultivo. [The raspberry and its culture.]** Rev. Agric. [Mexico] **5**: 120–123. *1 fig.* 1919.—A popular account of the cultivation of the raspberry in Mexico, including varieties recommended and uses of the fruit.—*John A. Stevenson.*

956. Beckwith, Charles S. **The effect of fertilizers on blueberries.** Soil Sci. **10**: 309–313. *Pl. 1.* 1920.—Field experiments are reported, indicating that the use of fertilizers increases the yield of blueberries. With 170 pounds of sodium nitrate, 230 pounds of dried blood, 340 pounds of steamed bone, 340 pounds of phosphate rock, and 170 pounds of Nebraska potash per acre, the yield was tripled.—*W. J. Robbins.*

957. Brierley, W. G. **Comparison of fall, winter and spring pruning of apple trees in Minnesota.** Proc. Amer. Soc. Hortic. Sci. **16**: 102–104 (1919) 1920.—Experiments were conducted in Minnesota to see what the effect would be of pruning apple trees during the different months of the fall, winter, and early summer. The author concludes as follows: "The conclusions to be drawn from these observations are that pruning in fall or winter in Minnesota is not detrimental to tree vigor, maturity of shoots, hardiness of growth or wound healing, and that the tips of shoots pruned in the fall and winter do not die back more than the tips of shoots pruned at other times. Apparently the apple grower in Minnesota can prune at a time most convenient for him, just as the growers in the East, South and West are doing."—*E. C. Auchter.*

958. Chandler, W. H. **Some results as to the response of fruit trees to pruning.** Proc. Amer. Soc. Hort. Sci. **16**: 88–101. (1919) 1920.—A progress report is given of the pruning experiments now being carried on at the Cornell University Experiment Station. The general purpose of the experiment, as given, is to test systems of training for some of the different fruits. In addition to merely keeping fruit yields and top growth, other data are being taken, in order to find out if possible the fundamental activities that determine yield or top growth.—Attention is drawn to the fact that the response of a tree to dormant or early summer pruning is an appearance of greater vigor. The leaves are larger and greener, and the twigs continue length growth later into the season. The general opinion is that this increased vigor is explained by the fact that a reduced number of growing points and a reduced cambial area make use of the reserve food supply of the tree. The author gives tables to show the pounds of dry weight, pounds of starch, and pounds of saccharose in the one-year twigs, older branches, trunk, large roots, and small roots of a seven-year-old Bismarck apple tree. The total amount of starch in the one-year twigs was relatively small, and if all the twigs were removed, the reduction in total carbohydrates for the tree would be small. Yet if all the twigs were pruned off, a greatly increased vigor would result. Although there would be a slight increase in carbohydrate supply for the opening buds, after pruning, still, the author states, it does not seem probable that this slight increase in reserve carbohydrate supply could account for the increase in vigor of twig growth, for this reserve, according to Price, is quickly exhausted. Price shows that practically all the starch disappears

from the live tissue above ground in about eighteen days after the leaves open, and Chandler shows that the soluble carbohydrates decrease greatly as growth begins. He states that pruning on June 1 resulted in increased vigor, even though the reserve carbohydrate supply must have been nearly exhausted. It is shown that pruning reduces the leaf surface, and thus by reducing transpiration, the demand for water from the roots is reduced. By reducing the number of growing points and the amount of cambial area, it should reduce the demand for mineral nutrients. The author states, "It would seem probable then that the increased vigor of top growth would continue until the reduced size of the tree would be balanced by a reduction in root growth due to the reduction in leaf surface. Thus pruning would be a dwarfing process. Experiments and tables are included to show that different branches on the same tree cannot be used in pruning experiments, because the one pruned branch would not have a fair chance or would not get the same amount of water, from the roots, due to the reduced leaf area, if the other branches were unpruned. This tends to explain the ease with which one branch on a tree is suppressed as compared with the others by pruning.—The effect of pruning on nursery trees was studied as was also the effect of nitrogen on newly planted peach trees. Tables were included to show the effect of the pruning, necessary to secure an open head, on the leaf surface of the trees.—An experiment was also carried on in 1919 to test the influence of summer pruning.—*E. C. Auchter.*

959. Chevalier, Aug. **Recherches sur les poiriers, noyers, châtaigniers des parties froides de l'Indo-Chine et du Sud de la Chine. [Research on pears, walnuts, and chestnuts in the colder regions of Indo-China and southern China.]** Compt. Rend. Acad. Sci. Paris 170: 1335–1336. 1920.—The following species are reported as wild: *Pirus Pashia, Pirus granulosa, Juglans sagillata,* and *Castanea Duclouxii.* The cultivated forms are *Pirus communis* and *P. Simonii* and *Juglans duclouxiana.*—*C. H. Farr.*

960. Collison, R. C. **A progress report of fertilizer experiments with fruits.** New York Agric. Exp. Sta. [Geneva] Bull. 477. *53 p.* 1920.—Experiments were conducted with apples in a nursery and in orchards, with cherries and pears in orchards, and with grapes in a vineyard. In Baldwin apple orchards the results as regards growth and yield were erratic. The growth of Spy apple trees in the orchard was generally increased by fertilizers, but not consistently. There was no significant difference in color or size of fruit. The growth of apple trees in the nursery was increased by the application of fertilizers containing potassium and phosphorus, but nitrate of soda was without effect. The growth and yield of cherry trees was increased by the use of fertilizers, and there were indications that the supply of available nitrogen may be a factor of some importance in vineyards. The author concludes that, in positive results, the experiments up to date have been very disappointing. Evidently, the effects of other factors operative in the experiments have masked any results of a positive nature which may have been due to the fertilizers applied.—*F. C. Stewart.*

961. Cunningham, G. H. **Mortality among stone fruit trees in Central Otago.** New Zealand Jour. Agric. 20: 359–364. 1920.—Excess of water is the cause of much injury in irrigated orchards. Stone-fruit trees are more susceptible than apples to such injury. Many orchards are set in soil which is too alkaline for fruit trees. *Valsa Leucostoma,* and *Nectria cinnabarina* were found as weakling parasites in some instances.—*N. J. Giddings.*

962. Dearing, Charles. **The muscadine grapes—their culture and uses.** Proc. Amer. Pomol. Soc. 1917: 52–59. *6 pl., 19 fig.* 1918.—Attention is drawn to the fact that the muscadine grapes were the first native American grapes to be brought under cultivation in this country and that the Scuppermong is the oldest named native, cultivated grape. The muscadine grapes are grown mainly in the southeast. After having briefly given the early history of the development of the muscadine grape industry, the author explained the investigational work with muscadine grapes of the United States Department of Agriculture.—A general field survey was first made to gather accurate information concerning the existing industry, and cultural experiments were started. These tests showed that (a) it is better to propa-

gate by cuttings than by layers; (b) nitrogenous fertilizer was beneficial, especially for young vines; (c) it is advantageous to practice regular plowing and harrowing; and (d) proper pruning is not only desirable but actually essential.—Pollination studies showed that the varieties were practically self-sterile and that male vines and bees were necessary for cross pollination. This question is now losing its importance, since the breeding work of the department has produced a new race of muscadine grape varieties which are perfect flowered and self-fertile.—Extensive experiments have been carried on to demonstrate the value of muscadine-grape by-products, and several have been originated.—The author summarizes his work as follows: "With the development of better cultural methods, greater and more varied utilization and the production through plant breeding of new and improved varieties, the Muscadine Grape industry seems to offer great promise of filling in the future a far more important rôle in American viticulture than it has in the past."—*E. C. Auchter.*

963. Dehn, W. M., and M. C. Taylor. **A chemical method for the detection in fruit of a prior frozen condition.** Jour. Indust. Eng. Chem. **12**: 977. 1920.—The method is based upon the fact that in the freezing of fruits the sucrose concentration is decreased, with an increase in the concentration of invert sugar.—*Henry Schmitz.*

964. Dunlap, H. C. **The California prune and apricot growers.** Monthly Bull. California State Commission Hort. **8**: 401–403. 1919.

965. Ellenwood, C. W., and Paul Thayer. **Thinning of apples, peaches and plums.** Monthly Bull. Ohio Agric. Exp. Sta. **5**[5]: 136–140. 1920.—A brief discussion is given, including reasons for thinning and the time when the practice can be followed to the greatest advantage. General suggestions for thinning are given.—*R. C. Thomas.*

966. Evans, H. H. **Report of district field inspector, Vernon.** British Columbia 14th Ann. Rept. Dept. Agric. **1919**: 24–25. 1920.

967. Evans, H. H. **Soil-fertility and crop production.** Agric. Jour. [British Columbia] **4**: 53. 1919.

968. Fisher, Hugo. **Pflanzenwuchs und Kohlensäure. [Plant growth and carbonic acid.]** Naturwissenschaften **8**: 413–417. 1920.—See Bot. Absts., Entry 1301.

969. Fortier, S. **Relation to orchard irrigation practice.** Monthly Bull. California State Commission Hort. **7**: 361–367. 1919.—See Bot. Absts. 7, Entry 1392.

970. Ginarte, Benjamin Muñoz. **Consideraciones sobre el cultivo de la piña en Cuba. [Cultivation of the pineapple in Cuba.]** Estac. Exp. Agron. Cuba Bol. **45**: 1–43. *16 fig.* 1919. —The writer discusses the cultivation of the pineapple in Cuba under the following heads: botanical classification, varieties, soils adapted to the culture, planting systems, propagation, time of planting, cultivation, fertilization, picking, packing, pests, yields and returns, and uses of the fruit.—*John A. Stevenson.*

971. Gojón, Carlos. **Trabajos ejecutados en la estacion agricola experimental para frutas tropicales, Cordoba. [Work of the experiment station for tropical fruits at Cordoba, Mexico.]** Rev. Agric. [Mexico] **5**: 109–112. *2 fig.* 1919. A report of plantings made of varieties of *Citrus Mangifera indica, Vitis,* and other tropical fruits.—*John A. Stevenson.*

972. Grabham, Michael. **The alligator pear.** Nature **105**: 517–518. 1920.—Note on cultivation of *Persea gratissima* in Madeira, where it is now in general cultivation for ornament and fruit. From seed, the trees bear in seven to ten years, reaching full maturity in twenty.—*O. A. Stevens.*

973. Grant, J. A. **Grading and packing fruit for market.** Agric. Jour. [British Columbia] 4: 358–359. 1919.

974. Green, W. J., Paul Thayer, and J. B. Keil. **Apples adapted for Ohio culture.** Monthly Bull. Ohio Agric. Exp. Sta. 5[10]: 270–271. 1920.—A discussion is given of the varietal characteristics and bearing habits of the Yellow Transparent which render it suitable for culture in Ohio.—*R. C. Thomas.*

975. Green, W. J., Paul Thayer, and J. B. Keil. **Varieties of apples adapted for Ohio culture.** Monthly Bull. Ohio Agric. Exp. Sta. 5[6]: 180–186. 1920.—This is a discussion of the relative merits of the Baldwin, Ben Davis, and Northern Spy varieties for Ohio culture.—*R. C. Thomas.*

976. Hedrick, U. P. **European grapes in eastern America.** Proc. Amer. Pomol. Soc. 1917: 46–52. *1 pl., 1 fig.* 1918.—A general account of the results of investigations at the New York (Geneva) experiment station with *Vitis Vinifera* is given. In 1911 cuttings of one hundred and one varieties of European grapes were obtained by the experiment station and cleft-grafted below ground onto several different species of *Vitis*. During the seven following years, several unfavorable seasons were encountered. The grapes passed through several very severe winters and some unusually hot, dry summers. The author states, "These test seasons have proved that European grapes will endure our (New York) climate as well as the native varieties except in the matter of cold,—they must have winter protection." Two methods of winter protection were used; some vines were covered with earth while others were wrapped with straw. The earth cover proved to be cheaper and more efficient. The vines are laid down and covered with a few inches of earth. Special pruning practices are necessary, due to the necessity of laying the vines down in winter, and a practical system is explained. The growing of European grapes is encouraged, and a list of good table-varieties is given. The author finally suggests that much more experimental evidence and information concerning the growing of European grapes in this country is needed, and exhorts different investigators to carry on experiments in this field.—*E. C. Auchter.*

977. Heinicke, Arthur J. **Concerning the shedding of flowers and fruits and other abscission phenomena in apples and pears.** Proc. Amer. Soc. Hortic. Sci. 16: 76–83. 1920.—Studies made of the shedding of leaves, fruit, petals, etc., showed that such abscission was due to the behavior of living cells near the base or at the node of the organ doomed to fall. In flowers and fruits, which were allowed to abscise in a humid atmosphere, a band of glistening tissue appeared around the base of the pedicel one to three days before abscission occurred. This band was the rim of a plate of cells that lie between the pedicel and cluster base. Just prior to separation, the walls of two to six tiers of cells on the abscission region gave a red color when treated with hydrcholoric acid, thus indicating that lignification had occurred. Tests for reducing sugars showed a heavy but non-localized brick-red precipitate both before and during the abscission process. Tests for nitrates showed no localization with reference to the separation region. The same was true of iron compounds. Catalase activity was especially marked in the separation zone.—Fruits doomed to fall, especially in cool, humid weather, did not gain in size as rapidly as the others. They appeared to be more matured, showing more of the normal color, and the flesh appeared and smelled more like ripe tissue. Fruits which fell did not appear to have as high a sap concentration as shown by depression of freezing point.—Flowers or young fruit injured by cold usually fall. Flowers are often similarly influenced by nutritional conditions, as was shown by some nitrate and sugar studies. Flowers with short stems did not set so well as those having longer stems. When the fleshy portion of the fruit was removed, the stem abscissed. Flowers exposed to illuminating gas fell off, and when fruit was coated with grafting wax, abscission generally followed. It was suggested that severe root pruning in early spring might be a factor in the abscission of immature fruits.—Water forced or pulled through twigs, spurs, etc., seemed to check abscission. Nitrogen in the tissues appeared to be an important factor in delaying leaf fall. This was shown practically when certain apple trees which had received an appli-

cation of nitrate of soda held their leaves much later in the fall than similar trees which had received no nitrate. When excised spurs with fruit were immersed in water, abscission did not occur.—The author concludes as follows: "The facts here presented and those recorded in the literature are not sufficient to afford an entirely satisfactory explanation of the behavior of the cells in the abscission zone. Undoubtedly, the causes that stimulate or excite the peculiar changes in this region are associated with variations in nutrition and water supply. If the tissues above the plane in which separation may occur is abundantly supplied with water and other substances that counteract maturity or favor translocation or utilization of assimilated material, conditions apparently are not favorable for manifestation of the meristematic nature of cells in the potential abscission zone. In many fruits effective fertilization helps to bring about these desirable conditions, but it should be remembered that development of seeds is only one of several possible means of causing a set. Self fruitfulness may be associated with the fact that the cells at the base of the pedicels of flowers on such varieties are not as easily stimulated into abscission activity as similar cells of self-barren trees."—*E. C. Auchter.*

978. Higgins, J. E. **The litchi—Litchi chinensis.** Proc. Amer. Pomol. Soc. **1917**: 59–66. 1918.—This paper gives a general discussion concerning our present knowledge of the litchi. A brief history of its origin and present distribution is included. Its cultural and fertilizer requirements are stated, and methods of propagation are discussed. In general, the trees do best on a deep, moist, alluvial soil and respond well to heavy applications of various manures. Air-layering is generally used as a means of propagation. A few trees are now growing in California and Florida, but the bulk of the crop is produced in southern China, India, Ceylon, and other parts of the Orient. Trees of the litchi are also found in Japan, Formosa, Australia, Hawaii, Mauritius, Brazil, and the West Indies. The fresh fruit is eaten in these countries, where the trees grow, but the dried litchi nut is the product generally found in our markets.—*E. C. Auchter.*

979. Hoy, B. **Report of district horticulturist and inspector of fruit pests, Okanagan Valley.** British Columbia 14th Ann. Rept. Dept. Agric. **1919**: 20–24. 1920.

980. Hunter, W. T. **Report of district field inspector, southern Okanagan, Similkameen and boundary districts.** British Columbia 14th Ann. Rept. Dept. Agric. **1919**: 22–24. 1920.

981. Husmann, George C. **Growing currant grapes.—A promising new industry for this country.** Proc. Amer. Pomol. Soc. **1917**: 66–69. *4 pl., 5 fig.* 1918.—Currant grapes were grown extensively in France until the Phylloxera destroyed the vineyards. At this time the plantings were greatly increased in Greece and were very profitable until the re-establishment of the French vineyards on Phylloxera-resistant grape stocks introduced from the United States.—The U. S. Department of Agriculture has demonstrated that these currant grapes can be profitably grown in this country. These grapes are among the earliest to ripen, and the crop can be dried and put away before the earliest rains occur in districts where other raisin varieties are too late in ripening.—Currant grapes were introduced into California in 1861. In 1901, David Fairchild introduced the Panariti variety from Greece. This proved to be greatly superior to the other varieties. When grafted on Phylloxera-resistant stock and stock suited to the soil and climate under which it is grown, it has proven extremely fruitful and profitable in California, Arizona, and southern Nevada. The author states, "It has been ascertained that to make the blossoms set and secure a full crop of fruit, the vines must be incised." This should be done while the vines are in blossom. When vines are planted eight by eight feet apart, they will yield an average of 10½ tons, or conservatively from two to five tons, of dried currents to the acre.—*E. C. Auchter.*

982. Kains, M. G. **Home fruits as educators of public taste.** Proc. Amer. Pomol. Soc. **1917**: 94–98. 1918.—Attention is drawn to the fact that in many of our large commercial orchards, varieties of fruit, often with only fair or even poor quality, are planted. It is shown that in the older home orchards or small fruit plantations, only fruits of the highest quali-

ties were planted. This tended to create a love of and demand for more fruit. The noted early pomologists were mostly amateurs, who loved good fruit. The statement is made that many of our fruit specialists of to-day were probably reared on farms, which had excellent home fruit plantations of high quality. The importance of replacing decrepit or old home orchards with fruits of the highest quality as well as the establishment of such new plantations on all farms is emphasized. It is suggested that such plantations will train future fruit lovers and specialists among the rising generation, and thereby home fruits will naturally continue, as in the past, to be educators of public taste.—*E. C. Auchter.*

983. Lyne, W. H. **Horticultural quarantine in B. C.** Agric. Jour. [British Columbia] 4: 132–133. 1919.—This is an address given by Mr. Lyne at the Interstate Plant Quarantine Conference, Riverside, California in May, 1919.—*J. M. Eastham.*

984. Lyne, W. H. **Report of chief inspector of imported fruit and nursery stock.** British Columbia 14th Ann. Rept. Dept. Agric. 1919: 45–49. 1920.

985. Macoun, W. T. **Apple breeding in Canada.** Proc. Amer. Pomol. Soc. 1917: 11–27. *1 pl., 1 fig.* 1918.—A great deal of the apple-breeding work in Canada has been done at the Central Exp. Farm, Ottawa, Ontario, although considerable work has been done at the Ontario Agric. Coll. Guelph, Ontario, and at the Hortic. Exp. Sta. at Vineland, Ontario. At the Central Exp. Farm an orchard of about 3000 trees grown from seed imported from Russsia, was planted in 1890. These started to fruit in 1897 and were mostly summer apples. Only a few, such as Claire, Neville, Oscar, Percival, Roslin and Rupert, were considered sufficiently promising to propagate.—In 1898, seeds were saved from a variety orchard; and seedlings, about 2000 in all, were grown. During the past 14 years, 1211 of the seedlings fruited. Three hundred and seventy-eight were considered promising enough to propagate, and 99 of the best were named. It was noted that the seedlings resembled their female parent in many particulars. A brief description of the seedlings originated from different varieties is given by the author. A descriptive table of the various seedlings is included, also a table giving the names of the named seedlings and such information as female parent, date of sowing seed, date of planting tree, date of first fruiting, etc.—A brief record of the early work of Wm. Saunders was given. In 1887 seeds of the "Berried Crab," *Pyrus baccata*, obtained from Russia were planted. The resulting seedlings proved very hardy. In 1894, many of the hardiest and best sorts of apples grown in Ontario were crossed on *Pyrus baccata* with the hope of improving the size and quality of fruit. In 1896 similar crosses were made on *P. prunifolia*, and in 1902 on *P. Malus*. Many of the best of the crosses have been recrossed, thus introducing a second portion of the characteristics of the larger apple. Many of Dr. Saunders' hybrids have proved hardier than any other varieties of apples or crab apples tested and are much larger than the original crabs.—The author states that it is important to obtain apples suitable for the prairie provinces of Canada as soon as possible. In 1910 seed from some of the hardiest Russian apples were sown. Many seedlings have been obtained, and it is hoped to secure valuable hardy sorts.—Some cross breeding has been done yearly since 1895, and, as a result, about 1000 trees are now growing. So far, not many apples that have fruited were thought worthy of propagation, but there were a few promising ones in the McIntosh-Lawver crosses where the object was to obtain varieties which would keep better than McIntosh. Following are those which have been named: Lawver × McIntosh, Holz, Vermac; McIntosh × Lawver, Mavis, Rustler.—*E. C. Auchter.*

986. Manaresi, Angelo. **Sui danni prodotti ai fiori degli alberi fruttiferi dalle gelate primaverili in genere e da quelle in particolare dei giorni 28, 29 e 30 marzo 1918. [Damage to flowers of fruit trees by spring frosts and in particular the frosts of the 28, 29 and 30 of March 1918.]** Rev. Patol. Veg. 10: 1–26. 1919.—At the time of these frosts the flowers of almonds and apricots had lost their petals, peaches were in full bloom, cherry blossoms were opening, and the floral buds of the plum, pear, and apple were swelling. In the almond and peach it was noted that many stigmas, styles, and ovaries turned brown and dried. The stamens were little injured. The pollen of several varieties of peaches germinated as well after as

before the frosts. The same pollen in maltose solution subjected to a temperature of −8°C. germinated very little. A temperature of —2.5°C. reduced the germination about half.—Notes are given on the relative amount of injury to different varieties of peaches and cherries, and tables show the same for pears and apples. The greatest injury was suffered by the almonds, and then in order of decreasing injury came peaches, pears, plums, apples, and cherries. Bibliography is appended.—*F. M. Blodgett.*

987. Matons, August. **La poda de l'olivera.** [**Pruning of the olive.**] Rev. Inst. Agric. Catalan de San Isidro **69**: 22–24, 37–38. 1920.

988. Matthews, C. D. **Report of the division of horticulture, North Carolina Agric. Exp. Sta.** Ann. Rept. **42**: 59–64. 1920.—A statement concerning the subject matter of investigations in progress, including tests on dehorning of peach trees and hardiness of peach varieties, variety testing, breeding, and top working of pecans, cultural practices with strawberries, and variety testing, storage, and selection of sweet potatoes.—*F. A. Wolf.*

989. Meek, B. B. **Oranges for Thanksgiving.** Monthly Bull. California State Commission Hort. **8**: 367–370. 1919.

990. Moore, J. G. **Scion root production by apple trees in the nursery.** Proc. Amer. Soc. Hortic. Sci. **16**: 84–88. (1919) 1920.—Studies were made at the Wisconsin experiment station concerning the possibility of producing apple trees on their own roots through using long scions in root grafting and planting such grafts deep in the nursery row. There were found to be wide differences in the ability of different varieties to produce scion roots. Although there was fluctuation from year to year in the relative percentages of trees of given varieties which produce roots, still for the most part the relative ability held fairly constant. A table of eighteen varieties showing the percentage of trees which rooted each year during the years 1914 to 1918, is included. It was found that with most varieties, even after three years in the nursery, the number of trees having sufficient scion roots to support themselves was very small. A table is included which shows that a higher percentage of grafts produce strong scion roots when grown in moist soil than when grown in dry soil. Groups of trees were planted at varying depths of from two to six inches. While there were some instances in which deeper planted grafts did not produce scion roots as well as the shallower ones, still, for the most part, the increase in root production was in proportion to the depth of planting. It was suggested that this was true because there was more soil moisture surrounding the basal portion of the deeper planted scions. The author states that two-year-old trees did not, under ordinary nursery conditions, possess sufficient roots to sustain themselves if the stock roots were removed. He also states, "It is clearly evident that if a large proportion of apple trees purchased by fruit growers are to possess at the time of planting scion roots sufficient to support them, it will be necessary to devise some new methods of propagation. Doubtless many of the long scion trees, which show few or no roots at planting in the orchard, develop them within two or three years after planting. However, if this is not so, then the additional care and expense in propagating trees from long scion grafts as now practised is largely wasted."—*E. C. Auchter.*

991. Munson, K. W. **Grafting the fruit-tree.** Agric. Jour. [British Columbia] **4**: 49. 1919.

992. Munson, K. W. **Intensive fruit-culture in Fraser Valley.** Agric. Jour. [British Columbia] **4**: 104. 1919.

993. Munson, K. W. **Pruning the balanced fruit-tree.** Agric. Jour. [British Columbia] **4**: 14–15. 1919.

994. Pachano, Abelardo. **El mildew de la viña.** [**Downy mildew of the grape.**] Quinta Norma. Estac. Exp. Circ. 9. *22 × 15 cm., 8 p.* Ambato, 1918.—See Bot. Absts. 7, Entry 1198.

995. Partridge, N. L. **Growth and yield in apple trees.** Proc. Amer. Soc. Hortic. Sci. 16: 104–109. (1919) 1920.—Studies made at the Delaware experiment station on the growth and yield, during the previous three years of ten-year-old Jonathan, Yellow Transparent, and Stayman Winesap apples, indicated strongly that there was a very consistent relationship between the growth that the tree made and the amount of fruit produced. It was shown that if the growth was smaller in 1918 than in 1917, the yield was larger in 1918; and the reverse was also true. Thus the author states, "There is an alternate habit of growth as well as an alternate habit of bearing in these trees. However in the case of the tree with an increasing yield this is not the case." It was suggested, however, that when trees with increasing yields finally had sufficient fruit produced in some year to depress the growth, such trees would then fall in the biennial habit of bearing and growth.—*E. C. Auchter.*

996. Pierce, G. W. **The almond industry.** Monthly Bull. California State Commission Hort. 8: 355–357. 1919.

997. Popenoe, Wilson. **The natural groups of mangos cultivated in Florida.** Proc. Amer. Pomol. Soc. 1917: 70–81. *5 pl., 5 fig.* 1918.—The varieties of mangos now grown in Florida have been classified by the author into a natural classification. The different varieties which resemble one another in certain general characters have been placed in groups according to these natural resemblances. In defining the groups, consideration was given to characters of growth, foliage, inflorescence, fruiting habits, and the fruit itself.—Two main divisions of the several groups are first made; namely, (1) bark rough; leaves having commonly 18 to 24 pair of primary transverse veins; and (2) bark smooth; leaves having commonly 26 to 30 pairs of primary transverse veins.—In the first division are included the following groups: Mulgoba, Alphonse, Sandersha, Madras, and Julie groups.—In the second division is included the one group—Cambodiana.—Detailed descriptions of each group are given in the paper, and the varieties which fall in each group are enumerated.—*E. C. Auchter.*

998. Rice, W. H. **Orchard sanitation.** New Zealand Jour. Agric. 20: 238–242. 1920.—A general discussion showing the importance of sunlight, air circulation, drainage, cultivation, and general cleanliness in orchard practices.—*N. J. Giddings.*

999. Roberts, R. H. **Studies in biennial fruiting.** Proc. Amer. Pomol. Soc. 1919: 28–33. 1918.—Careful studies were made at the Wisconsin experiment station concerning the biennial fruiting of certain apple varieties. The effects of blossom formation, spur growths, and leaf areas during one year on the amount of bloom the following year were noted. The author's general conclusions are as follows: "While no definite solution of the off-year question is attempted, two statements bearing upon this matter can be made as a result of the investigations.—(1) Biennial blossoming and fruiting is not due to a constitutional habit of the tree. If it were due to a definite plant habit, successive blossoming could not have been induced by blossom removal. Investigations with other plants show that blossom-bud production is associated with the amount of plant-foods present. Qualitative tests indicate the same condition in the apple. The off year, then, evidently results from a condition of nutrition within the plant and not from a growth habit.—(2) Annual bearing by successive blossoming of individual spurs cannot be expected. When the spur produces blossoms and develops them to the point of setting fruit, it seldom blossoms again the next year. The development of blossoms to the stage at which the fruit can be said to have set together with the presence of excessive numbers of blossom spurs, seems to be the determining factor in the ability of the spur to blossom in successive seasons. If annual bearing can be produced, it must apparently be brought about by having a double system of spurs, which fruit in alternate seasons. How this may be accomplished fully cannot be stated further than to refer to the condition as pointed out before, that excess growth as well as very weak growth was associated with the failure to form blossom buds. The normal blossom spurs are usually one-eighth to one-half inch in length. If their growth is increased to one to two inches, they

usually fail to produce blossom buds. Such a change, which must come from an influence on individual spurs, would require pruning of a rather detailed nature. The influence of cultivation and soil fertility in increasing the general growth of the tree would also have a large part to play in causing an increased growth that is associated with the failure to produce an excessive number of blossoms. These factors have been shown by practice and experiment to have a marked corrective influence on biennial bearing.—Blossom bud formation is due to a condition within the plant. This condition is subject to modification by a number of external factors. In working to obtain annual bearing, it may be necessary to modify the orchard cultivation, the amounts of fertilizer applied, the available moisture content of the soil, the pruning, or various combinations of these factors.—*E. C. Auchter.*

1000. Stark, Paul C. **The small orchard—how to make it profitable.** Proc. Amer. Pomol. Soc. **1917**: 99–106. 1918.—The author shows that the small home orchard plays an important part in the nation's food supply. He compares the food value of fruits with that of meats, etc. He points out, that as a whole the returns per acre are as large if not larger from fruits as from other crops. In summarizing, he urges (1) that people plant and grow back yard fruit gardens along with their vegetable gardens, (2) that every farm have its own home orchard for home consumption and sell the surplus on the local markets; (3) that farmers be shown how to renovate their neglected orchards so that they will be the best paying part of the farm, and that they be shown how simple it is to produce first-class fruit instead of wormy culls.—*E. C. Auchter.*

1001. Stewart, John P. **Fertilization of apple orchards.** Proc. Amer. Pomol. Soc. **1917**: 34–45. *1 pl., 1 fig.* 1918.—The results of the past nine-years' experimental work in apple orchard fertilization as carried on by the Pennsylvania experiment station is given. Similar experiments were carried on in several different orchards throughout the state. Applications of nitrogen, phosphorus, and potash, singly and in different combinations, were made in the various orchards. Tables showing the fruit yields and tree growths, as influenced by the various treatments, are given. The results in the Johnston orchard, 20 years old at the start of the experiment, and in the Brown orchard, 21 years old at the start, show that nitrogen (nitrate of soda) influenced the yields more than any of the other elements. Greater returns from the nitrogen applications seemed to result when phosphorus was also added. In younger orchards such as the Strode orchard, nitrogen increased the growth of the trees but did not materially increase the yield of fruit. In the Tyson orchard, potash seemed to give the best results. A plan for local orchard fertilizer tests is given. It is stated that the best time to apply the fertilizer, especially nitrogen, is in the early spring before the blossoms open. It should be spread over the surface of the ground beneath the spread of the limbs. It is suggested that it might be well to apply part of the nitrogen before the blossoms open and part after the fruit had set.—*E. C. Auchter.*

1002. Thayer, Paul, J. B. Keil, and W. J. Green. **Varieties of apples adapted for Ohio culture.** Monthly Bull. Ohio Agric. Exp. Sta. **5**[9]: 252–255. 1920.—A discussion is given of the relative merits of the banana and ensee varieties of apples for culture in Ohio.—*R. C. Thomas.*

1003. Tufts, W. P. **The so-called "New system of pruning."** Monthly Bull. California State Commission Hortic. **8**: 424–426. 1919.—The lighter the pruning, the heavier and stockier the tree becomes. By intelligent pruning during the early life of the fruit tree, it can be brought into bearing two or three years sooner than has generally been the case in California.—Author reports upon data found in Bull. 313 of the University of California.—*E. L. Overholser.*

1004. Wester, P. J. **Vegetative propagation of tropical fruit.** Proc. Amer. Pomol. Soc. **1917**: 82–94. *9 pl., 40 fig.* 1918.—Attention is drawn to the fact that there are great opportunities for improvement of the tropical fruits merely by the discovery of a practical method of propagating the various species asexually. Considerable experimental work in shield

budding has been carried on by the writer with tropical fruits at the Lamao Experiment Station, Philippine Islands. Brief directions for the vegetative propagation of 110 tropical and semi-tropical fruits are given.—*E. C. Auchter.*

1005. White, E. W. **Report of Assistant Horticulturist and Inspector of fruit pests, Vancouver Island and Lower Mainland districts.** British Columbia 14th Ann. Rept. Dept. Agric. 1919: 15–19. 1920.

1006. White, E. W. **The prospects in strawberries.** Agric. Jour. [British Columbia] 4: 178–179. 1919.

1007. White, E. W. **The queen of fruits.** Agric. Jour. [British Columbia] 4: 47. 1919.—A popular article on strawberry growing in British Columbia.—*J. W. Eastham.*

1008. Whitten, J. C. **The relation of experiment station work to practical fruit growing.** Monthly Bull. California State Commission Hortic. 8: 421–423. 1919.—The detail study of the fruit tree, its structure, composition and nutrition, and the influence of heat, cold, etc., has revealed the fruit tree as a living, plastic, shapable thing, which has a very sensitive response. to the various stimuli of its environment. The revelation has completely revolutionized the old systems of pruning.—*E. L. Overholser.*

1009. Yeager, A. F. **Horticulture.** North Dakota Agric. Coll. Ext. Circ. 40: 13–16. 1920.—Discusses trees, shrubs, fruits, and vegetables for the state.—*L. R. Waldron.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1010. Anonymous. **Alpine plants for rock-gardens.** [Rev. of: Farrer, R. **The English rock-garden.** Vol. 1. *XIV + 504 p., 52 pl.* Vol. 2. *VIII + 554 p., 50 pl.* T. C. and E. C. Jack: London and Edinburgh, 1919.] Nature 104: 664–666. *1 fig.* 1920.—Reviewer finds it "a real compendium of sound information and learning, though unduly biased in certain respects" and burdened with superfluous language.—*O. A. Stevens.*

1011. Anonymous. **Aquarium exhibit.** Missouri Bot. Gard. Bull. 7: 63–67. 1919.—A. list of thirty plants suitable for aquaria.—*O. T. Wilson.*

1012. Anonymous. **Native plants suitable for the gardens of Missouri and adjoining states.** Missouri Bot. Gard. Bull. 8: 35–46, 52–59, 63–67, 69–77, 85–94, 104–110. 1920.—Shrubs and other plants are listed as follows: plants suitable for rock gardens; hardy native plants for the water garden and native vines and climbing plants; native trees and shrubs with conspicuous flowers; native perennials for the hardy border; native perennials for natural and wild gardens, and hardy native ferns and plants of similar culture; native shrubs for mass planting (flowers inconspicuous); native trees and shrubs with brightly colored foliage in autumn and conspicuous fruit and bark in autumn and winter, and native evergreen trees and shrubs.—*O. T. Wilson.*

1013. Anonymous. **Commercial mushroom cultivation.** Jour. Ministry Agric. Great Britain 27: 678–680. 1920.

1014. Balfour, F. R. S. **Rhododendron at Dawyck Stobo, Tweed-Dale.** Rhododendron Soc. Notes 1: 223–224. 1920.—The hardiness of many species is recorded.—*Alfred Rehder.*

1015. Balfour, I. Bailey. **Some large leaved Rhododendrons.** Rhododendron Soc. Notes 1: 204–222. 1920.

1016. Bean, W. J. **The Fortunei group of Rhododendrons.** Rhododendron Soc. Notes 1: 187–194. 1919.

1017. Dominguez, Ignacio. **El cultivo de las plantas florales ornamentales. [Cultivation of ornamental plants.]** Rev. Agric. [Mexico] 5: 208–218. *16 fig.* 1919.—Outlines methods of propagating ornamentals in general.—*John A. Stevenson.*

1018. Hopkins, S. H. **A sweet-pea farm on V[ancouver] I[sland].** Agric. Jour. [British Columbia] 4: 238. 1919.

1019. Loder, Edmund Giles. **List of Rhododendron species growing at Leonardslee, near Horsham, Sussex, September, 1918.** Rhododendron Soc. Notes 1: 197–200. 1919.—A list of about 200 species and a few varieties, with introductory notes on the nomenclature of some species.—*Alfred Rehder.*

1020. Magor, E. J. P. **Notes from Lamellan Garden, 1919.** Rhododendron Soc. Notes. 1: 229–231. 1920.—The flowers of some rare species are described, and three new hybrids mentioned.—*Alfred Rehder.*

1021. Moore, H. Armytage. **Rhododendrons at Rowallane, Co. Down.** Rhododendron Soc. Notes 1: 233–235. 1920.—Notes on rare species.—*Alfred Rehder.*

1022. Secrest, Edmund. **Protection for shade trees.** Monthly Bull. Ohio Agric. Exp. Sta. 5^{6}: 163–169. 1920.—A discussion is given of the relative merits of various types of tree guards in current use, and of the importance of tree surgery.—*R. C. Thomas.*

1023. Stoddard, W. B. **Alaska flower and vegetable gardens.** Seed World 8^{6}: 17–18. 1920.

1024. Williams, J. C. **Some notes on the raising of Rhododendron seedlings.** Rhododendron Soc. Notes 1: 237–238. 1920.

1025. Williams, P. D. **Notes on Chinese Rhododendrons as grown in Cornwall.** Rhododendron Soc. Notes 1: 239–240. 1920.—Chiefly notes on flowers of ornamental species.—*Alfred Rehder.*

VEGETABLE CULTURE

1026. Burdett, James H. **Summary of the first season's work of the national garden bureau.** Seed World 7^{12}: 13–15. 1920.

1027. Hood, G. W. **Keeping qualities of hubbard squash.** Proc. Amer. Soc. Hortic. Sci. 16: 186–188. (1919)–1920. Hubbard squashes were kept in storage from November 1 until last of March. The temperature of the storage room fluctuated between 40–50° F. Fourteen average-sized specimens were placed in storage two succeeding years. The average shrinkage, due primarily to water loss, was 23.18 per cent; the greatest monthly shrinkage was in March.—*H. A. Jones.*

1028. Hood, G. W. **Varietal variations as seen in similar methods of training tomatoes.** Proc. Amer. Soc. Hortic. Sci. 16: 183–185 (1919)–1920.—Stone, June Pink, and Earliana varieties of tomatoes were handled as follows in the open field: (1) staked and pruned to one stem, (2) staked and not pruned, (3) pruned and not staked, and (4) neither staked nor pruned. All varieties produced the greatest amount of ripe fruit when the vines were neither pruned not staked. The Stone and June Pink produced the least amount of ripe fruit when the vines were both staked and pruned, while the Earliana produced the least amount of ripe fruit when pruned and not staked. In no case did the plants that were neither pruned nor staked produce the maximum amount of green fruit at the end of the season.—*H. A. Jones.*

1029. Keil, J. B. **Cellar storage of vegetables.** Monthly Bull. Ohio Agric. Exp. Sta. 5^{10}: 266–269. 1920.—The farm storage cellar is the type particularly in mind. The importance of keeping the storage sanitary and of maintaining correct temperatures is pointed out.

Certain vegetables are classified according to the effect of freezing upon them. Proper storage conditions for potatoes are outlined. The importance of a spring with running water for regulating temperature and humidity is referred to.—*R. C. Thomas.*

1030. Keil, J. B. **Home production of vegetable seeds.** Monthly Bull. Ohio Agric. Exp. Sta. 5[7]: 216–219. 1920.—This is a discussion of methods of selection, improvement, care, and storage of vegetable seeds.—*R. C. Thomas.*

1031. Lloyd, J. W. **The need of vegetable investigations.** Proc. Amer. Soc. Hortic. Sci. 16: 171–175. (1919)–1920.—The author cites the following lines of work as being especially in need of further investigation: (1) variety nomenclature, (2) structure and composition of vegetables, (3) development of varieties tolerant of particular conditions, (4) disease resistance and disease control, (5) manure substitutes, (6) storage, and (7) the preservation of perishable produce.—*H. A. Jones.*

1032. McCall, F. E. **The farm and garden.** Proc. Amer. Soc. Hortic. Sci. 16: 188–190. (1919)–1920.—Results are given of coöperative farm-garden demonstrations carried on in South Dakota during the years 1916–1919, inclusive.—*H. A. Jones.*

1033. McMeans, A. **Vegetable-seed growing on Pacific Coast.** Agric. Jour. [British Columbia] 4: 5. 1919.

1034. Rosa, J. T. **Nature of hardening in vegetable plants.** Proc. Amer. Soc. Hortic. Sci. 16: 190–197. (1919)–1920.—Tomato represents the group of plants that cannot be hardened to any great extent, while the cabbage and lettuce represent the group which develop hardiness to a considerable degree. In hardening, cabbage becomes a lighter green and often shows some pink coloration. The amount of bloom increases; leaves become more leathery and stems more woody; there is a gradual increase in the percentage of dry weight; the area of the palisade cells decreases; and the freezing point of the sap is lowered. Carbohydrate changes accompanying hardening are also significant. There is an accumulation of sugar, but this increase is much greater in plants exposed to low temperature than in those subjected to desiccation. "There is also an increase in starch and total polysaccharids in hardened cabbage plants." Practices that slow up or check the rate of growth of cabbage, lettuce, or tomatoes induce a greater degree of hardiness to cold.—*H. A. Jones.*

1035. Wirthle, F., and E. Rheinberger. **Über Rangoonbohnen. [Lima beans.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 346–349. 1920.—This article deals with morphology and chemical composition of lima beans. The cyanide content of lima beans from Würzburg varied from 6.1 to 12.2 mgm. in 100 grams.—*H. G. Barbour.*

HORTICULTURE, PRODUCTS

1036. Anonymous. **La harina de platano. [Banana flour.]** Agric. Mexicano y Hogar 36: 180–181. 1920.

1037. Anonymous. **La industria italiana del aceite de pepitas de uva. [The Italian grapeseed oil industry.]** Informacion Agric. [Madrid] 10: 406–408. 1920.—The method of extraction is given.—*John A. Stevenson.*

1038. Baño, Jose de. **Conservacion de los racimos de uvca fresca. [Preservation of fresh grapes.]** Rev. Agric. [Mexico] 5: 265–267. *5 fig.* 1919.—The author discusses various methods of preserving and shipping fresh grapes, by using ground cork, sawdust, or other materials.—*John A. Stevenson.*

1039. Brierly, W. G. **Cider- and vinegar-making qualities of Minnesota apples.** Minnesota Agric. Exp. Sta. Bull. 185. *23 p., 5 fig.* 1920.

1040. Campbell, C. H. **Jelly.** Jour. Indust. Eng. Chem. **12**: 558–559. 1920. A method for the quantitative determination of pectin is given. Ten cc. of filtered juice is added drop by drop from a pipette, with vigorous stirring, to 180 cc. of alcohol. The solution is filtered, immediately dissolved in boiling distilled water, evaporated to dryness, heated two hours at 70°C. *in vacuo*, weighed, burnt to ash, and reweighed. The loss in weight multiplied by ten gives the percentage of pectin in the juice.—*Henry Schmitz.*

1041. Krug, O., and Hans Filchner. **Die Weinerte 1919 in der Pfalz.** [**The 1919 yield in the Palatinate.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 153–157. 1920.

1042. Kryz, F. **Der essbare Anteil einiger westindischer Obstsorten.** (**Edible portion of certain West Indian fruits.**) Zeitschr. Untersuch. Nahrungs-u. Genussmittel **38**: 366–367. 1919.

1043. Kryz, F. **Der Gehalt der Karobenfrüchte an essbarem Anteil und Samen.** [**Edible portion and seed content of locust bean.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 353–355. 1920.

1044. De Manjaries, Ramon. **Aprovechamiento de orujos y alpechines de la aceituna.** [**Utilization of olive bagasse.**] Rev. Inst. Agric. Catalan de San Isidro **69**: 261–263. 1920.—The author advises the use of the waste products remaining after the oil is extracted from the olive as fertilizers or for distillation. The material is said to yield the same products as wood, the supply of which in Spain is very limited.—*John A. Stevenson.*

1045. Schmitt, R. **Untersuchung von 1919-er Traubenmosten Frankens.** [**Musts of Franconia.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 198–204. 1920.

1046. Sprinkmeyer, H., and O. Gruenert. **Über Vanillinerzeugnisse.** [**Vanilla products.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 145–148. 1920.—Methods of preserving aroma.—*H. G. Barbour.*

1047. Wellenstein and Seiler. **Über Zuckerung und Saureruckgang von Moselweinen.** [**Sugaring and souring of Mosel wine.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 1–30. 1920.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

1048. Anonymous. [Rev. of: Small, James. **The origin and development of the Compositae.** Reprint No. II from the New Phytologist. *334 p.* Wesley & Son.] Jour. Botany **58**: 202–204. 1920.—See Bot. Absts. **7**, Entry 333.

1049. H., W. P. [Rev. of: Church, A. H. **On the interpretation of phenomena of phyllotaxis.** Oxford Botanical Memoirs, No. 6. *58 p., 18 fig.* 1920.] Jour. Botany **58**: 228–230. 1920.

1050. Anonymous. **A university course in botany.** [Rev. of: Church, A. H. **Botanical Memoirs. 4. Elementary notes on structural botany.** *27 p.* **5. Elementary notes on the reproduction of angiosperms.** *24 p.* Oxford Univ. Press: London, 1919.] Nature **105**: 162. 1920.—See Bot. Absts. **7**, Entry 717.

1051. Arber, Agnes. **On the leaf structure of certain Liliaceae, considered in relation to the phyllode theory.** Ann. Botany **34**: 447–465. *38 fig.* 1920.—The phyllode theory of the monocotyledonous leaf is here applied in many selected cases from the Liliaceae, and the

author's interpretation of the leaf structure on the basis of that theory is given. The species studied belong for the most part to the Asphodeloideae and Allioideae. The evidence, which is given in detail for each species studied, is considered to indicate that in different cases the leaf is morphologically (1) leaf-base phyllode, (2) petiolar phyllode, (3) chiefly leaf-base with small petiolar region, and (4) chiefly petiole with small leaf-base region.—*W. P. Thompson.*

1052. Arber, Agnes. **The vegetative morphology of Pistia and the Lemnaceae.** Proc. Roy. Soc. London B. **91**: 96–103. *8 fig.* 1920.—Engler's early work on lemnaceous homology of *Pistia* is confirmed and extended. Presence of row of inverted bundles in "limb" of *Pistia* indicates that it is a petiolar phyllode, and this finding is applied to *Spirodela*, in which the inverted bundles are missing. In the latter plant, buds are borne in lateral pockets formed by ligules on either side of limb or frond. In *Pistia* the limb is fused along its median line with the rudimentary plant axis, leaving no space for axial buds; consequently buds occur at one side in recessed pockets comparable with those in *Spirodela.*—*Paul B. Sears.*

1053. Boodle, L. A. **The mode of origin and the vascular supply of the adventitious leaves of Cyclamen.** Ann. Botany **34**: 431–437 *6 fig.* 1920.—When seedling tubers of *Cyclamen* are decapitated, adventitious leaves develop usually from near the margin of the cut and occasionally from the cut surface itself. The development of these leaves and particularly of their vascular supply is described. The internal tissues of the leaf are always derived from the sub-epidermal tissues of the tuber; but the epidermis of the leaf may be either epidermal or subepidermal in origin, depending on whether periderm had previously been developed. The procambial strands develop rapidly from the leaf rudiment inwards, soon forming connections with two or three bundles of the tuber. All the cells in a transverse section of a strand are derived from a single cortical cell. No definite opinion is reached in regard to the nature of the stimulus requisite for the initiation of the leaf trace, but reference is made to Simon's conclusion that in somewhat analogous cases the stimulus depends on the distribution of water in the tissues.—*W. P. Thompson.*

1054. Brewster, A. A. **Aril of Cupania and Synoum.** Australian Nat. **4**: 170. 1920.

1055. Brewster, A. A. **Microzamia or burrawang.** Australian Nat. **4**: 162–164, 167, 169. *Pl. 3.* 1920.—A popular account of the morphology of the flower, seed, and seedling.—*T. C. Frye.*

1056. Brown, Elizabeth Dorothy Wuist. **Apogamy in Osmunda cinnamonea and O. Claytoniana.** Bull. Torrey Bot. Club **47**: 339–345. *10 fig.* 1920.—Only one case has previously been reported of apogamy in *Osmunda.* Descriptions are given in this paper of one case in *O. cinnamonea*, and of three in *O. Claytoniana*, but none occurred in cultures of *O. regalis.*—*P. A. Munz.*

1057. Brown, Forest B. H. **The silicious skeleton of tracheids and fibers.** Bull. Torrey Bot. Club **47**: 407–424. *5 fig.* 1920.—Secondary xylem, when it shrinks or swells, does not change in length, yet details of anatomy have not shown why one dimension of the cells concerned should vary independently of another. A study of the minute structure of the secondary thickening of the walls in fibers and tracheids of wood and in fibers of bast, shows that there is a greater mineralization in parts of this wall than in the rest. These mineralized tracts run longitudinally and form a skeletal structure going from one end of the cell to the other. These rods imbibe little or no water and allow practically no change in length, but the matrix between them, by swelling or shrinking, permits tangential or radial change in volume. The structure of the fiber wall was found to be essentially the same in some 500 species studied, the skeleton consisting of sparingly branched rods which become reticulate in the vicinity of pits or have transverse connections. These skeleton rods seem to be silicious in many cases, although there is variation in different families, genera, or even species as to composition. They can be demonstrated by partial combustion of a section on a slide, the portions along the burned margin showing small noncombustible rods.—*P. A. Munz.*

1058. Brown, J. G. **The cycads.** [Rev. of: Chamberlain, Charles J. **The living cycads.** Univ. of Chicago Press: Chicago, 1919.] Plant World **22**: 364–365. 1919.

1059. Browne, Isabel M. P. **Phylogenetic considerations on the internodal vascular strands of Equisetum.** New Phytol. **19**: 11–25. *7 fig.* 1920.—See Bot. Absts. 7, Entry 1101.

1060. Bugnon, P. **Dans la tige des Graminées, certains faisceaux liberoligneux longitudinaux peuvent être des faisceaux gemmaires. [In the stem of grasses, certain longitudinal fibrovascular bundles seem to arise from the "gemmaire" bundles.]** Compt. Rend. Acad. Sci. Paris, **170**: 1201–1203. *4 fig.* 1920.—The longitudinal bundles are prolongations of leaf traces, but the transverse bundles at the nodes may be variously interpreted. The "gemmaire" bundles of *Poa annua* may take a longitudinal course like those of the leaf traces.—*C. H. Farr.*

1061. Drummond, Montagu. **Besleria lutea Linn., a new example of water-calyx.** Ann. Botany **34**: 551–553. 1920.—A description is given of the water-calyx of *Besleria lutea*, a Gesneraceous shrub native in the West Indies and South America. This is the first record of a water-calyx in the family, most of the other examples being found in the related Bignoniaceae. The greatly inflated calyx tube is filled with a clear liquid from the early bud stage until the corolla is fully open. The liquid is probably secreted by capitate glands on the inner epidermis of the calyx.—*W. P. Thompson.*

1062. Griebel, C. **Die mikroskopische Untersuchung der Tee-und Tabakersatzstoffe. [Microscopy of tea and tobacco substitutes.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 225–299. 1920.—See Bot. Absts. 7, Entry 1283.

1063. Grier, N. M. **Notes on comparative regeneration in Elodea and Ceratophyllum.** Amer. Botanist **26**: 80–84. 1920.—Segments of *Elodea canadensis* must contain a localized bud- and root-forming region, which occurs about every tenth node, in order to regenerate. Each segment of *Ceratophyllum demersum* seems capable of budding. If more than one node is included in the segment, only certain favorably located buds develop.—*S. P. Nichols.*

1064. Hill, A. W. **Studies in seed germination. Experiments with Cyclamen.** Ann. Botany **34**: 417–429. *Pl. 20, 15 fig.* 1920.—The seedling of *Cyclamen* possesses a single cotyledon and a rudimentary curved protuberance lying opposite to it. Morphological evidence is given to show that this rudimentary organ is really a suppressed second cotyledon. This evidence is supported by the results of experiments. It may be induced to develop by the removal of the first cotyledon, and then responds to the removal of its lamina by regenerating a new lamina or new laminae, just as does the first cotyledon when its lamina only is removed. Plumular leaves are unable to respond in this way. The seedling of *Cyclamen*, therefore, through aberrant in type, is truly dicotyledonous in nature.—*W. P. Thompson.*

1065. Kuster, Ernst. **Botanische Betrachtungen über entwicklungsmechanische Begriffe. [Botanical considerations of the principles of the mechanics of development.]** Naturwissenschaften **8**: 453–457. 1920.—A discussion from the standpoint of the botanist of how far the general principles of the mechanics of development, as formulated by Roux, apply to the problems in plant development. This issue is devoted to Roux's work and is in honor of his seventieth birthday.—*Orton L. Clark.*

1066. Markle, M. S. **Some abnormalities in plant structure.** Proc. Indiana Acad. Sci. **1918**: 117–124. *9 fig.* 1920.—The author discusses briefly, and figures: some embedded archegonia and antheridia of ferns; an embryo-sac of *Lilium* with cells all at one end; a "3-story" reproductive branch of *Vaucheria;* and a megaspore tetrad of *Selaginella* with wall around group instead of individual spores.—*F. C. Anderson.*

1067. Mattirolo, Oreste. **Commemorazione di Saverio Belli. [Memorial to Saverio Belli.]** Atti R. Accad. Sci. Torino **55**: 8–30. 1919–1920. See Bot. Absts. 7, Entry 704.

1068. Ogura, Yudsuru. **Some observations on the growth in thickness of trees, especially with regard to that of Cryptomeria japonica.** Bot. Mag. Tokyo 34: 81–109. 1920.—An English abstract of a fuller account in Japanese in the same volume. The author's observations agree in general with those reported by earlier observers except that he did not find any close agreement between precipitation and the thickness of annual rings.—*L. L. Burlingame.*

1069. [P., D.] **James William Helenus Trail.** Proc. Roy. Soc. London **B, 91**: vii–xl. 1920.—Born at Briasy, Orkney, Mar. 4, 1851; died Sept. 18, 1919. Classical and medical education. 1873–75 naturalist South American expedition, displaying exceptional ability. 1877 became Professor of Botany at Aberdeen. Linnean Society, sometime editor *Scottish Naturalist*, later botanical editor *Annals Scottish Natural History* as well as member various European learned societies, being well known for work on galls. President Botanical Section British Association 1910. Death leaves unfinished *Flora of Northeastern Scotland.*—*Paul B. Sears.*

1070. Patton, R. T. **On the growth, treatment and structure of some common hardwoods.** Proc. Roy. Soc. Victoria 31 (N. S.): 394–411. *Pl. 21, 7 fig.* 1919.—See Bot. Absts. 7, Entry 811.

1071. Rivett, Maud F. **The anatomy of Rhododendron ponticum L. and of Ilex aquifolium L., in reference to specific conductivity.** Ann. Botany 34: 525–550. 1920.—See Bot. Absts. 7, Entry 1297.

1072. S., M. **James William Helenus Trail, M.A., M.D., F.R.S., F.L.S.** New Phytol. 19: 46–48. 1920.—A brief biography of Professor Trail. [See also Bot. Absts. 7, Entry 1069.]—*I. F. Lewis.*

1073. Souèges, René. **Embryogénie des Solanacées. Développement de l'embryon chez les Nicotiana. [Embryogeny of the Solanaceae. Development of the embryo of Nicotiana.]** Compt. Rend. Acad. Sci. Paris 170: 1125–1127. *9 fig.* 1920.—The proembryo develops as does that of *Chenopodium Bonus-Henricus*, except that the apical cell of the two-celled stage divides before the basal. The division of both these cells is horizontal. In these respects it differs from *Capsella.*—*C. H. Farr.*

1074. St. John, Harold. **A teratological specimen of Aralia hispida.** Rhodora 22: 152–153. 1920.—A description of an abnormal specimen of this species collected on Rattlesnake Mountain, Tyrone, Blair Co., Pennsylvania, in which the umbels of the inflorescence seemed from a distance to be crowned by tufts of green leaves instead of the white flowers or dark angular fruits. Closer examination revealed several types of abnormality in the individual flowers. Apparently the condition was not traumatic.—*James P. Poole.*

1075. Uphof, J. C. Th. **Contributions towards a knowledge of the anatomy of the genus Selaginella. The root.** Ann. Botany 34: 493–517. *13 fig.* 1920.—The greater part of this paper is devoted to a description of the histological details in the root and rhizophore of eighteen species of *Selaginella.* Each species is taken up individually. The more general results are as follows: There is no important anatomical difference in any species between root and rhizophore, while both differ markedly from the stem, notably in lacking lacunae and trabeculae; both are, moreover, negatively heliotropic. It is therefore concluded that the rhizophores are true roots and not leafless stems, as is commonly believed. The vascular system in both is monarch with well developed xylem; endodermis and pericycle are always present; the elements of the phloem are arranged as in the stem.—*W. P. Thompson.*

1076. Uphof, J. C. Th. **Physiological anatomy of xerophytic Selaginellas.** New Phytol. 19: 101–131. *12 fig.* 1920.

1077. Weatherwax, Paul. **A misconception as to the structure of the ear of maize.** Bull. Torrey Bot. Club 47: 359–362. *6 fig.* 1920.—The fact that the rows of an ear of corn always occur in pairs and that, if one member of a pair is dropped part way up the ear, both are, has led to the natural inference that "these irregularities are due to the discontinuance of one or more rows of paired spikelets." Collins, in his recent theory as to the origin of the ear, maintains that each pair of spikelets is yoked structurally with another pair on the opposite side and that reduction in number from base to tip is due to the loss of spikelets from yoked pairs. Observation, however, does not bear out Collins' contention. Examples are given in which loss of only one pair, and not of yoked pairs, occurs. [See also Bot. Absts. 7, Entry 246.]—*P. A. Munz.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

1078. Andrews, A. LeRoy. **Tortula caroliniana, new species.** Bryologist 23: 72–76. *Pl. 5.* 1920.—A description and figures of a new propaguliferous *Tortula* from North Carolina are given, with extended discussion of its relationships and of the apparent identity with it of certain specimens from central and western Mexico.—*E. B. Chamberlain.*

1079. Arnell, H. W., and C. Jensen. **En bryologisk utflykt till Västmanland. [A bryological trip to Västmanland.]** Svensk. Bot. Tidskr. 12: 298–323. 1918.—In the latter part of September, 1915, the authors, in company with G. Samuelsson and E. Melin, visited the northern portion of Västmanland, Sweden, and the results of this trip are recorded in the present paper. The bryophytes collected are first listed separately for each of the localities explored, with definite notes regarding substrata. A systematic catalogue of all the species found is then given. This includes 87 hepatics, 29 *Sphagna*, and 190 mosses, giving a total of 306 species. Two new varieties are described under *Bryum inclinatum*, and *Martinellia mucronata* (H. Buch), originally published as *Scapania mucronata*, is proposed as a new combination. In conclusion attention is again drawn to some of the more noteworthy forms collected, and the various species of *Sphagnum* are tabulated according to their special habitats.—*W. W. Gilbert.*

1080. Brewster, A. A. **Dawsonia polytrichoides, a hardy moss.** Australian Nat. 4: 164–166, 168–169. *Pl. 4.* 1920.—The author gives a somewhat popular discussion of the structure and reproduction of *Dawsonia polytrichoides* R. Br.—*T. C. Frye.*

1081. Bryan, Geo. S. **The fusion of the ventral canal cell and egg in Sphagnum subsecundum.** Amer. Jour. Botany 7: 223–230. *Pl. 14, 15.* 1920.—See Bot. Absts. 6, Entry 979.

1082. Dixon, H. N. **Contributions to antarctic bryology.** Bryologist 23: 65–71. *Pl. 4.* 1920.—The article deals with two collections of mosses, one from Deception Island, South Shetlands, and the other from South Georgia. Deception Isalnd, which has been isolated from a remote period, is a high mountain shell surrounding a sea-filled crater; a small lagoon fed by hot springs maintains a temperature considerably above the surrounding ocean. These conditions seem unique. One small collection yielded 8 species of mosses, one of which, *Bryum crateris*, was new to science. The moss flora of South Georgia contains about 45 per cent endemic species. In the present article 8 species are listed, two, *Andreaea subremotifolia* and *Verrucidens intermedius*, being new to science.—*E. B. Chamberlain.*

1083. Fleischer, M. [Rev. of: Schiffner, V. **Über Lophozia Hatcheri und L. Bauerianа. (On Lophoria Hatcheri and L. Baueriana.)** Oesterreich. Bot. Zeitschr. 66: 83–88. *1 fig.* 1916.] Hedwigia 60: (Beiblatt) 35–36. 1918.—In comparing *L. Hatcheri* of Patagonia with the closely related *L. Bauerianа* of Europe and North America Schiffner reached the conclusion that these two species ought not to be considered synonyms. In commenting on

this conclusion the reviewer emphasizes the danger of regarding two similar plants as distinct species merely because they occur in widely separated regions and are absent from intervening areas. He shows how it is possible for a species to have a discontinuous distribution of this type and advises that each case be decided on its own merits after careful study of all available data.—*A. W. Evans.*

1084. Fleischer, M. [Rev. of: Timm, R. **Neue wichtige Moosfunde aus dem nordwestlichen Deutschland. (Important new discoveries of mosses in northwestern Germany.)** Allg. Bot. Zeitschr. **1916**: 17–27. 1916.] Hedwigia **60**: (Beiblatt) 38. 1918.—The reviewer expresses the opinion that certain species of *Drepanocladus* and *Stereodon*, listed by the author, represent forms or varieties rather than true species.—*A. W. Evans.*

1085. Fleischer, M. [Rev. of: Kern, F. **Beiträge zur Moosflora der Bayrischen Alpen. (Notes on the moss flora of the Bavarian Alps.)** Jahresber. Schles. Ges. Vaterl. Kultur. **1917**: 1–6. 1917.] Hedwigia **60**: (Beiblatt) 127–128. 1918.—The reviewer comments on the nomenclature of a few of the mosses listed by the author.—*A. W. Evans.*

1086. H[ieronymus], G. [Rev. of: Van den Broeck, H. **Les muscinées de l'Herbier belge du Jardin botanique de l'État à Bruxelles. (Bryophytes of the Belgian herbarium of the National Botanical Garden at Brussels.)** Bull. Jard. Bot. Bruxelles **4**: 243–303. 1914.] Hedwigia **60**: (Beiblatt) 129. 1918.—The reviewer emphasizes the importance of this contribution to the bryophytic flora of Belgium.—*A. W. Evans.*

1087. Fleischer, M. **Die Moosvegetation im Urwald von Bialowies. [The moss vegetation in the primitive forest of Bialowies.]** Bot. Jahrb. **55** (Beiheft): 113–124. 1919.—See Bot. Absts. 6, Entry 1506.

1088. Haynes, Caroline C. **Illustrations of six species of Riccia, with the original descriptions.** Bull. Torrey Bot. Club **47**: 279–287. *Pl. 10–13.* 1920.—Descriptions and figures are given of the following North American species of *Riccia: R. Donnellii* Aust., *R. dictyospora* M. A. Howe, *R. Beyrichiana* Hampe, *R. arvensis* Aust.. *R. hirta* Aust., *R. Curtisii* James.—*P. A. Munz.*

1089. Lorch, W. **Die Torsionen der Laubmooseta. [Torsions in the setae of mosses.]** Hedwigia **61**: 40–91. 1919.—See Bot. Absts. 6, Entry 1351.

1090. Pearson, W. H. **Diplophyllum taxifolium in Westmoreland.** Naturalist **1918**: 234. 1918.—The discovery of *Diplophyllum taxifolium* on Hart Crag, Westmoreland, England, by L. J. Cocks, is reported. The species is new to the county of Westmoreland.—*W. H. Pearson.*

1091. Rickett, H. W. **Regeneration in Sphaerocarpos Donnellii.** Bull. Torrey Bot. Club **47**: 347–357. *Fig. 1–25.* 1920.—Regeneration, or the production of adventitious shoots from vegetative tissue, was observed in *Sphaerocarpos Donnellii* either when the thallus as whole was partly dead, or when portions of it were separated partly or wholly from the rest. In general regeneration originates from a single cell, with a tendency in early stages toward a formation of a two-sided apical cell. A typical thallus develops from the first cell-mass in a way analogous to the development of a mature thallus from the tube formed by a germinating spore.—*P. A. Munz.*

1092. Rubner, K. [Rev. of: Grebe, C. **Studien zur Biologie und Geographie der Laubmoose. I. Biologie und Ökologie der Laubmoose. (Studies on the biology and geography of mosses. I. Biology and ecology of mosses.)** Hedwigia **59**: 1–208. 1917.] Forstwiss. Centralbl. **41**: 431–433. 1919.—See Bot. Absts. 6, Entry 610.

1093. Thériot, I. **Contribution à la flore bryologique de Madagascar. [Contribution to Madagascan mosses.]** Recueil Publ. Soc. Havraise Études Diverses **87**: 95–111. *Pl. 1, 2.* 1920.—The paper gives a list of 66 species of mosses and 8 of hepatics, the latter without

data. The moss list contains precise statements of locality, together with distributional or diagnostic notes upon many of the species, even the commonest. *Campylopus Echernieri* Besch. and *Amblystegium riparium* (L.) B. & S. are reported from Madagascar for the first time, and the fruiting plant of *Leucoloma albocinctum* R. & C. is here first described. *Funaria delicatula, Brachymenium argenteum, Bryum Perrieri, Philonotis Perrieri,* and *Rhacopilum Perrieri* are described as new. There are likewise discussoins of *Brachymenium capitulatum* Mitt. and its Madagascan occurerence; of the generic characters of *Nanomitriopsis* R. & C., and of the variability of *Pogonatum subformosum* Besch., a new variety being described and figured. *Leucomium mahorense* Besch. is reduced to a synonym of *L. debile* (Sull.) Mitt.—*E. B. Chamberlain.*

1094. Williams, R. S. **Calymperaceae of North America.** Bull. Torrey Bot. Club **47**: 367–396. *Pl. 15–17.* 1920.—A discussion is given of the Calymperaceae to be treated in the North American Flora and comprising the genera *Syrrhopodon* and *Calymperes.* In the former genus are described the following species: *S. rigidus* Hook. & Grev., *S. Bernoullii* C. Müll., *S. floridanus* Sull., *S. incompletus* Schwaegr., *S. Berterianus* (Brid.) C. Müll., *S. martinicensis* Broth, *S. Gaudichaudii* Mont., *S. inflexus* Mitt., *S. Husnoti* Besch., *S. flavescens* C. Müll., *S. tenuifolius* (Sull.) Mitt., *S. lycopodioides* (Sw.) C. Müll., *S. recurvulus* Mitt., *S. graminicola* Williams sp. nov., *S. elongatus* Sull., *S. texanus* Sull., *S. ligulatus* Mont., *S. parasiticus* (Sw.) Besch., *S. filigerus* (Aust.) Williams comb. nov.; in *Calymperes* the following are given: *C. Richardi* C. Müll., *C. cubense* Williams sp. nov., *C. emersum* C. Müll., *C. disciforme* C. Müll., *C. Donnellii* Aust., *C. nicaraguense* Ren. & Card., *C. Heribaudi* Paris & Broth., *C. Nashii* Williams sp. nov., *C. Guildingii* Hook & Grev., *C. lonchophyllum* Schwaegr., *C. Levyanum* Besch. and *C. fluviatile* Williams sp. nov.—*P. A. Munz.*

1095. Williams, R. S. **Sematophyllum Smallii, sp. nov.** Bryologist **23**: 76–78. *Pl. 6.* 1820.—Under the above name the author describes and figures a new moss from Florida.—*E. B. Chamberlain.*

1096. Willis, M. A. **Notes on two hepatics.** Ann. Rept. and Trans. Manchester Microsc. Soc. **1916**: 44–45. 1918.—The author briefly describes the gametophytes of *Sphaerocarpus michelii* and the capsule of *Anthoceros laevis.*—*C. E. Allen.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

1097. Anonymous. **Ancestral studies of Compositae.** [Rev. of: Small, J. **The origin and development of the Compositae.** New Phytol. Reprint No. 11. *XI + 334 p., 6 pl.* Wm. Wesley and Son: London, 1919.] Nature **105**: 450. 1920.—See Bot. Absts. 7, Entry 333.

1098. Arber, E. A. N. and F. W. Lawfield. **On the external morphology of the stems of Calamites, with a revision of the British species of Calamophloios and Dictyocalamites of Upper Carboniferous Age.** Jour. Linn. Soc. Bot. London **44**: 507–530. *Pl. 23–25.* 1920.—A treatment of the morphology of the rather rare casts or impressions of the external features of Calamite stems with a short systematic revision of the best known British members of the genera Calamophloios and Dictyocalamites, genera recently proposed by Arber for these fossils in order that they may be distinguished from the much more common pith casts. The following external features are discussed in detail: nodes, internodes, leaf scars, branch scars, and root scars. There is much difficulty in correlating specimens showing external features with those represented only by pith casts; this correlation, however, is made in several cases.—*A. J. Eames.*

1099. Berry, Edward W. **The geological history of the sweet gum and witch hazel.** Plant World **22**: 345–354. *2 fig.* 1919.—The present distribution of the sweet gum and witch hazel is shown on a map. The disconnected distribution is a sure indication of ancient line-

age and a former occupation of areas where now they are extinct. The oldest authentic fossils of sweet gum are found in the Eocene of Greenland, Alaska, and Oregon. Records in the Oligocene are very rare, the only species having been found in Italy. The Miocene shows nine species, surprisingly like the modern sweet gum. In the Pliocene the gums were cosmopolitan in the northern hemisphere, but the succeeding glacial period killed them out in Europe, whereas they survived in North America and Asia. High mountains and seas in southern Europe prevented the escape of the gums to more genial climes in that continent; but in Asia and North America southern migration and return after the glacial period was possible. The witch hazels shows similar distribution today in America and Asia. Witch hazel occurs as fossils in Europe before the glacial epoch, but is extinct there now.—*Charles A. Shull.*

1100. Berry, E. W. **Paleontology and pragmatism.** Science 52: 529–531. Dec. 3, 1920.

1101. Browne, Isabel M. P. **Phylogenetic considerations on the internodal vascular strands of Equisetum** New Phytol. 19: 11–25. *7 fig.* 1920.—The internodal strands of *Equisetum* are phylogenetic units that may conveniently be termed bundles, though it is not suggested that they are in any strict sense equivalent to the ordinary internodal bundles of angiosperms. The types of bundles found in axes of recent species are considered to have been derived from a single continuous xylem strand, with the metaxylem on its flanks, by the replacement of xylem with parenchymatous elements.—*I. F. Lewis.*

1102. Dahms, P. **Über rumänischen Bernstein.** [On Roumanian Amber.] Centralbl. f. Miner. 1920: 102–118. *Fig. 8.* 1920.—The author discusses the sparingly fossiliferous fossil gum or resin "Rumanite" from the Tertiary of Roumania.—*E. W. Berry.*

1103. Fisher, Hugo. **Pflanzenmetamorphose und Abstammungslehre.** (**Plant metamorphosis and evolution.**) Naturwissenschaften 8: 268–271. 1920.—The change is noted from Goethe's concept of Morphologie and from its early descriptive literature to that of modern developmental history of plant organs, in which through experimentation the investigator has obtained an insight into the causes underlying changes in plant forms. The deepening of the meaning of plant metamorphosis when interpreted in light of the evolution of plants is then pointed out with numerous examples. We see a development in a certain direction (Orthogenesis of Eimer) but no inheritance of acquired characters is proven. The causes of such evolution are still unknown, but outer causes play only a small part. Metamorphosis is not purposeful except, perhaps, in certain cases, such as adaptations found in changes from a water to land habitat.—*Orton L. Clark.*

1104. Florin, Rudolf. **Einige chinesische Tertiärpflanzen.** [Chinese tertiary plants.] Svensk. Bot. Tidskrift 14: 239–243. *Fig. 11.* 1920.—The author records the following Tertiary plants from near Han-nor in Mongolia: *Pinus* sp., **Comptonia anderssonii** n. sp., *Carpinus* sp., and *Phyllites.*—*E. W. Berry.*

1105. Johansson, Nils. **Neue Mesozoische Pflanzen aus Andö in Norwegen.** [**New Mesozoic plants from Andö in Norway.**] Svensk. Bot. Tidskrift 14: 249–257. *Fig. 23.* 1920. —From the upper Jurassic or Lower Cretaceous of Andö—the only known Mesozoic plant locality in Norway—the author records *Cladophlebis*, *Taeniopteris*, *Feildenia*, and three species of *Sciadopitytes*, of which two—**S. lagerheimii** and **S. persulcata**—are considered as new.—*E. W. Berry.*

1106. Krasser, F. **Die Doggerflora von Sardinia.** [**The Dogger flora of Sardinia.**] Sitzungsber. Akad. Wiss. Wien 1 (no. 129): 3–26. 1920.—In a continuation of previous studies the author records 37 species of plants from the middle Jurassic of Sardinia. Twenty-three of these are common to the Oolite of the English Yorkshire coast region. A new Williamsonialian fructification is described as **Laconiella sardinica**, an Araucarian seed is described as *Araucarites* **sardinicus**, and a new type of stem is described as **Sardoa robitscheki.**—*E. W. Berry.*

1107. Kryshtofovich, A. **A fossil walnut from Tsurumi in the district of Konagawa, Japan.** Jour. Geol. Soc. Tokyo. 1920. *6 p., 1 pl.* 1920.—The author describes a walnut close to the existing *Juglans sieboldiana* from the supposed Tertiary of Tsurumi, Japan.—*E. W. Berry.*

1108. Máyas, G. **Funde neuer Pflanzenreste aus dem Kulm von Chemnitz-Borna.** [**New fossil plants from the Culm (Lower Carboniferous) of Chemnitz-Borna.**] XX Bericht Naturw. Gesell. Chemnitz. 55–68. *1 fig., 4 pl.* 1920.—The author records the following from the Lower Carboniferous of Chemnitz-Borna: Fourteen Archaeopteridae, of which *Adiantites* **neuropteroides,** *Sphenopteridium* **beckerti,** *S.* **divaricatum,** and *S.* **latilobatum** are new; thirteen Sphenopteridae, of which *Rhodea* **minima** and *R.* **nindeli** are new; two Pecopteridae; two Neuropteridae; and two ferm stems.—*E. W. Berry.*

1109. Menzel, P. **Über Pflanzenreste aus Basalttuffen des Kamerungebietes.** [**On plant fossils from the Basalt tuff of Kamerum.**] Beitr. Geol. Erfors. Deutschen Schutzgebiete **18:** 17–32. *Fig. 6, pl. 1.* Geol. Landesanstalt: Berlin, 1920.—The author lists 234 species in 48 families of tropical African plants preserved in a volcanic tuff in Kamerun, one of the former German colonies in western Africa. The only species described and figured is a species of *Sterculia* close to the existing *S. tragacantha* Lindley. All of the fossils are extremely close to still-existing species of the region, and their age is not determined, but may be anything from late Tertiary to recent. The probabilities all point to the very modern age of the fossil flora.—*E. W. Berry.*

1110. Mohr, H. **Über Funde von Holzkohle im Loszlehm von St. Peter bei Gratz.** [**On the finding of Lignite in the loamy loess at St. Peter near Gratz.**] Ver. Geol. R.-A. **1919:** 327–332. 1919.—The author records lignite in the loamy loess of the Pleistocene from near Gratz in Styria.—*E. W. Berry.*

1111. Moodie, R. L. **Thread moulds and bacteria in the Devonian.** Science **51:** 14. Jan., 1920.—While making a study of the skeletal parts of ancient vertebrates, the attention of the writer was attracted to enlarged and distorted shapes of lacunae in the carapace of *Borthriolepis* and *Coccosteus*, and to the occurrence of thread moulds and bacteria in the lacunar spaces. The course of growth of these organisms is briefly described. The conditions as outlined by the author are regarded as those of decay of ancient times, and not of disease. He considers that agents of decay similar to those of the present time have been at work for many millions of years, at least since Devonian times.—*A. H. Chivers.*

1112. Moodie, R. L. **Evolution's most romantic moment.** Sci. Monthly. **11:** 464–469. *5 fig.* 1920.—The Mazon creek in northern Illinois has just cut through 40 feet of glacial deposit and into the shales and rock of the Coal Period. These red shales contain an occasional rounded nodule which cracks open and reveals a Paleozoic insect, fish, leaf, or one of the first animals with legs, such as our present day mud-puppies.—*L. Pace.*

1113. Moore, R. L. **Ancient bacteria and the beginnings of disease.** Sci. Monthly **11:** 362–364. 1920.—Germs are among the oldest inhabitants of the earth. Walcott discovered bacteria in the oldest fossil-bearing rocks of North America in central Montana. They were rock builders and were found in association with algae. An analogous form is especially active in the Coral reefs in the West Indies today. These ancient ones are called Micrococcus. They were harmless. It is only after the Coal Period that infected wounds are found. The action of early parasites on the shells of ancient animals is the oldest evidence of disease.—Early man may have acquired some of his diseases from animals; for, as seen from the diseased appearance of their bones, men of the stone ages were often afflicted with the same maladies as the cave-inhabiting animals.—*L. Pace.*

1114. Nindel, F. **Ein Beitrag zur Foyolia sterzeliana (Weiss) aus dem OberKulm von Chemnitz-Borna.** [**Notes on Fayolia sterzeliana from the upper Culm (Lower Carboniferous) of Chemnitz-Borna.**] XX Bericht Naturw. Gesell. Chemnitz. 49–54. *Fig. 3.* 1920.

1115. Patton, R. T. **Notes on eucalypt leaves occurring in the tertiary beds at Bulla.** Proc. Roy. Soc. Victoria 31 (N. S.): 362–363. 1919.—Fossil leaves were found in fine mudstone deposited along the banks of the stream beneath the newer basalt. They were among other leaves and lycopodinaceous casts and casts of crushed stems. The material was not sufficient for positive identification. All leaf specimens were of one general type: moderately broad, lanceolate, and slightly falcate; with marginal vein moderately removed from edge, slightly indented; with lateral veins diverging at an angle of 50°, and margin fading into petiole. Leaves are beyond earliest stage of eucalypt evolution and show resemblances to *E. rostrata*.—*Eloise Gerry.*

1116. Raineri, R. **Alghe fossili corallinacee della Libia.** [Some fossil Corallinaceae from Libya.] Atti della Soc. Ital. Sci. Nat. e del Museo Civico Milano. **59**: 137. 1920.—The author calls attention to the abundant algal flora preserved in the Upper Cretaceous, Cenomanian, and Turonian stages in the territories of Homs and Cussabat in northern Tripoli. The following forms are recorded from Africa for the first time: *Archeolithothamnium turonicum* Rothpletz, *A.* aff. *gosaviense* Rothpletz, **A. Paronai** n. sp., *Lithothamnium amphiroaeformis* Rothpletz, *Lithothamnium* or *Corollina* sp. indet., **Amphiroa Mottiroliana** n. sp., and **Arthrocardia cretacica** n. sp. This is the first record of the genera *Amphiroa* and *Arthrocardia* in the Cretaceous, neither having been heretofore known in deposits earlier than the Tertiary. —*R. Pampanini.*

1117. Rather, F. A. **Fossils and life.** Sci. Monthly **11**: 429–435. 1920.—Extracts from an address given at the Cardiff meeting of the British A. A. S. Form, habitat, tempo of evolution, the rhythm of life, and the future and man's relation to it are discussed, using only animal fossils as illustrations.—*L. Pace.*

1118. Strausz, E. **Ein verkieselter Kletterfarn von Chemnitz-Hilbersdorf.** [A silicified climbing fern from Chemnitz-Hilbersdorf.] XX Bericht Naturw. Gesell. Chemnitz. 46. 1920.—Records a silicified Zygopteris from the Carboniferous of Chemnitz-Hilbersdorf.—*E. W. Berry.*

1119. Strausz, E. **Eine Medullosa stellata mit Blattnarben.** [A Medulla stellata with leaf scars.] XX Bericht Naturw. Gesell. Chemnitz. 47–48. *2 fig.* 1920.—The author describes a stem of *Medullosa stellata* from the middle Rothliegende (Permian) which shows leaf scars.—*E. W. Berry.*

1120. Stutzer, O. **Über Torfdolomite in Kohlenflözen.** [On calcareous concretions in coal.] Braunkohle. **19**: 146–147. 1920.—A summary of the old discussion by Stopes and Watson on the calcareous concretions "Coal balls" found in the British Coal Measures.—*E. W. Berry.*

1121. T(ansley), A. G. **The evolution of plants.** [Rev. of: Church, A. H. **Thalassiophyta and the subaerial transmigration.** Oxford Bot. Mem. 3. *99 p.* Oxford Univ. Press: London, 1919.] New Phytol. **19**: 1–10. 1920.

1122. Thomson, J. A. **The system of animate nature.** 2 vol. *23 cm.* H. Holt and Co.: New York, 1920.

1123. Wieland, G. R. **Recedent lake shores of the Cretaceous.** Science **52**: 537–538. 1920.—Tufaceous concretions in the southern Black Hills and near Medicine Bow, Wyoming, are thought to mark the receding shores of Cretaceous lakes, and these concretions are thought to be indicative of algal activity.—*E. W. Berry.*

1124. Zalessky, M. D. **Über einen durch eine Zyanalge gebildeten marinen Sapropel silurischen Alters (Kuckersit).** [A Silurian blue-green algal marine Sapropelite.] Centralbl. f. Miner. 1920: 77–94. *Fig. 10.* 1920.—The author describes the new genus **Gloeocapsomorpha,** a supposed blue-green alga, Cyanophyceae, which forms the Silurian Sapropelite known as Kuckersite.—*E. W. Berry.*

PATHOLOGY

G. H. Coons, *Editor*
C. W. Bennett, *Assistant Editor*

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1125. Anonymous. [Rev. of: Jarvis, E. **Sugar cane diseases at Highleigh.** Cairns Post.] Australian Sugar Jour. 12: 363. 1920.—Reports presence of a sugar-cane disease at Highleigh, near Gardonvale, which was due to the presence of the very free occurrence of two fungi—cane rust (*Uromyces Kühnii*) and *Cercospora sacchari*—that normally cause little or no injury. These fungi are always more or less in evidence on older leaves of half-grown cane, but this year owing to wet weather they multiplied in places to injurious degree. If these appear in March or April it is suggested that the lower leaves be stripped and burned at once, but only when the trouble may be considered as being likely to extend to and destroy young foliage. If the disease appears at the end of June or July, the risk of damage is far less, for the sunny weather checks the growth of the fungus. Such factors as proper cultivation, drainage, manuring, and the planting of varieties less susceptible to leaf diseases and the burning of trash after harvesting, are to be recommended.—*E. Koch.*

1126. Arnaud, G. **Notes de Pathologie vegetale. [Phytopathological notes.]** Bull. Soc. Path. Veg. France 7: 54–56. 1920.—Report of observations in the department of Gard, France, April, 1920. The diseases are regarded as due to a period of dry, north winds. The following diseases, which had apparently developed during a moist period preceding the dry period, were observed: Peach pocket (*Exoascus deformans*) on peach and almond; *Coryneum beijerinckii* on walnut, peach, apricot, almond, cherry, and prune; *Monilia cinerea* on cherry; *Taphrina bullata* and *Nectria ditissima* on pear; *Stromatinia cydoniae* on cydonia; *Cycloconium oleaginum* on olive; and chlorosis of grape.—*C. L. Shear.*

1127. Arthur, J. C. **Two destructive rusts ready to invade the United States.** Science 51: 246. 1920.—Two rusts which seem to have possibilities of great harm, but which have not yet invaded the United States, are mentioned. The first is *Uredo arachidis*, a rust of peanuts, which is widely distributed in South America and is common in the West Indies. The rust has been known to mycologists since 1884, but only recently has it attracted the attention of the cultivator. Mr. Robson reports from Montserrat that in some years the disease is a serious menace to the peanut crop of the British West Indies. This rust appears to be working its way northward, since it was reported from Porto Rico in 1913, and from Cuba in 1915. The second rust, *Puccinia pitteriana*, infects potatoes and tomatoes. It was found in Costa Rica in 1904 and 1916, and in Ecuador in 1918. Only one kind of spore, the teliospore, is produced in the life cycle, and this spore germinates at once. The habit of this fungus and its mode of distribution are essentially those of the hollyhock rust. The author points out that both of the above rusts may be capable of great damage if established in a region where suitable host crops are extensively grown.—*A. H. Chivers.*

1128. Baudyš, E. **Prinos gljiva Bosne i Hercogovine. [Fungous flora of Bosnia and Herzgovinia.]** Glasnik zemaljskog Muzeja u Bosni i Hercegovini 30: 317–328. (1918)–1919.—*Phaneroascus quercinus* n. g., n. sp. (Plectascineae) on living leaves of *Quercus schneideri*. *Phyllosticta allii* n. sp. on living leaves of *A. ampeloprasum*. *Alternaria holcina* (new?) on *Holcus mollis*.—*Mulgedium panciéii* is a new host for *Puccinia mulgedii*. [Through abst. by Matouschek in Zeitschr. Pflanzenkr. 30: 147. 1920.]—*D. Reddick.*

1129. Birmingham, W. A. **A condition resembling American "peach rosette."** Agric. Gaz. New South Wales 31: 581–582. *1 fig.* 1920.—Conditions appeared upon young trees, cions of which had come from America. This disease has evidently been unknown from Australia. Descriptions and suggestions for control are given.—*L. R. Waldron.*

1130. Cockayne, A. H. **Fire blight.** New Zealand Jour. Agric. **20**: 156–157. 1920.—Fire blight due to *Bacillus amylovorus* has appeared in New Zealand. Control methods are suggested, and hope of eradication is expressed.—*N. J. Giddings.*

1131. Cruchet. **Études mycologiques. Les champignons parasites du "brome dressé," Bromus erectus Huds. [Fungous parasites of B. erectus.]** Bull. Soc. Vandoise Sci. Nat. **51**: 583–586. 1918.

1132. Drayton, F. L. **The essentials of a Dominion plant disease survey.** Ann. Rept. Quebec Soc. Protection of Plants **12**: 31–33. 1920.—A paper pointing out the advantages to be derived from a well-organized plant-disease survey of the Dominion of Canada and the necessity for coöperation in this survey.—*B. T. Dickson.*

1133. Ducomet, V. **Un oidium de la pomme de terre. [A powdery mildew of the potato.]** Bull. Soc. Path. Veg. France **7**: 57–58. 1920.—An oidium is reported on potato (var. Czarine) in Lotet-Garonne in September. Several species have been reported on potato. It is thought this is probably *Erysiphe polygoni*, which was also found on weeds among the potatoes.—*C. L. Shear.*

1134. Eastham, J. W. **Report of the Provincial Plant Pathologist.** Dept. Agric. British Columbia Ann. Rept. **14**: 41–44. 1920.—Yellow rust of raspberries (*Phragmidium imitans*) caused some alarm by its unusual prevalence early in the season, but did not seem to result in much injury to the crop. *Gymnoconia interstitialis* has not been recorded in British Columbia. Walnut bacteriosis (*Pseudomonas juglandis*) was severe on certain trees near Vancouver. Western tomato blight (cause uncertain) brought about loss in the southern Okanagan. Experimental spraying for the control of apple tree anthracnose (*Neofabraea malicorticis*) shows that one early application of 3–4–40 Bordeaux mixture gave good control, and in the case of the variety chosen (Baldwin) gave no extra cost in marketing, the spray material having all disappeared from the fruit during storage preceding packing. As a result of spraying, the fruit also kept better.—*J. W. Eastham.*

1135. Müller, N. C. **Bericht über die Tätigkeit der Agrikulturchemischen Kontrollstation und der Versuchsstation für Pflanzenkrankheiten der Landwirtschaftskammer für die Provinz Sachsen fur die Jahre. 1916 und 1917.** Halle a. s. *60 p.* 1918.—On pages 25 to 29 E. Molz reports on diseases occurring in the province. Early blight of potato (*A. solani*) was wide-spread. *Fusarium culmorum* in roots of asparagus was investigated. Stem rot of red clover (*Gloeosporium caulivorum*) occurred to the extent of 50 to 60 per cent. [Through abst. by: O. von K[irchner] in Zeitschr. Pflanzenkr. **30**: 22. 1920.]—*D. Reddick.*

1136. Pachano, Abelardo. **La enfermedad de California o de Anaheim. [The California vine disease.]** Quinta Normal Estac. Expt. Circ. **11**. *8 p.* 1918.—The California vine disease has been discovered at Ambato, Ecuador. The symptoms are described, and the theories as to the cause are reviewed.—*F. M. Blodgett.*

1137. Puttemans, A. **Sur l'Oidium du Chene au Brazil. [The powdery mildew of oak in Brazil.]** Bull. Soc. Path. Veg. France **7**: 37–40. 1920.—*Quercus pedunculata*, which has been introduced into Brazil, has been found to be attacked by several fungi, and in 1912 the powdery mildew was first observed on it in the vicinity of San Paulo. The disease was so severe in September and October that the plants were defoliated. The weather was cold and wet.—The fungus is thought to have been introduced from Europe. In order to determine whether or not the conidia would live for a sufficient period to allow of transmitting the disease from Europe to Brazil, experiments were tried, and it was found that the spores retained the power of germination for a period of from ten to twelve days; this would permit of its transporation from Madeira to Brazil.—*C. L. Shear.*

1138. Ramiréz, Roman. **Dos parasitos de la remolacha. [Two beet parasites.]** Rev. Agric. [Mexico] **5**: 141–142. *1 fig.* 1919.—An insect pest and a leaf spot due to *Septoria* sp. are reported on the beet (*Beta vulgaris*).—*John A. Stevenson.*

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

1139. Bisby, G. R. **Studies of Fusarium disease of potatoes and truck crops in Minnesota.** Minnesota Agric. Exp. Sta. Bull. 181. *58 p., 11 pl., 30 fig.* Mar., 1919.—*Fusarium oxysporum* is the cause of potato wilt. It may attack any part of the potato plant and may cause rot of the seed tuber under field conditions. In the fall it may attack plants which have previously produced a normal crop of tubers. Tubers from affected plants are less satisfactory for planting than those from healthy plants. Any measures which tend to keep the plants vigorous, particularly during the latter part of the season, lessen the danger of wilt.—*Fusarium discolor sulphureum* gains entrance through wounds or through the uninjured surface, and causes dry rot in storage potatoes. Tubers from normal potato vines are subject to this rot. None of the varieties tested were resistant to this dry rot. It may develop on unsprouted tubers even under dry conditions at temperatures below 2°C. At temperatures below 16°C. this fungus produces abundant aerial mycelium, and at 20° to 30°C. a dense pseudopionnotes. This fungus does not affect the starch grains. Wilt in potato plants is not produced, but affected tubers may produce weak sprouts or none.—Careful handling to avoid injury and cleanliness in storage houses are important measures in avoiding injury by rot. The indications are that wilt- or root-rot-producing species of *Fusarium* may show a selective tendency toward host plants. No single species of *Fusarium* is responsible for storage rots in vegetables, cucumbers, and tomatoes. Species of *Fusarium* were found to produce substances that inhibited the germination of spores of the same or other species. After being boiled, solutions of these substances allowed normal germination. *Fusarium* produced substances injurious to excised leaves of potato, coleus, and ragweed. Boiling did not destroy this property. The species of *Fusarium* examined could withstand drying, low temperatures, and alternate thawing and freezing. They were able to utilize a wide variety of food substances.—*A. C. Arny.*

1140. Clinton, G. P., and McCormick, Florence A. **Artificial infection of pines with Cronartium ribicola.** Amer. Plant Pest Committee Bull. **4:** 12. 1920.—Same work as reported in Connecticut Agric. Exp. Sta. Bull. **214:** 428–459. *Pl. 37–43.* 1916–1918.—See Bot. Absts. 6, Entry 225.

1141. Dastur, J. F. **The mode of infection by smut in sugar cane.** Ann. Botany **34:** 391–397. *Fig. 1–10.* 1920.—Experiments with sugar-cane smut (*Ustilago sacchari*) showed that infection takes place in susceptible "thin" varieties through the tender buds, but not through old buds unless wounded. The infecting germ tube was found to enter the host tissues through unthickened scale hairs. Infection did not occur through the cut ends of the sets. "Thick" varieties of cane were only infected through wounded tender buds.—*W. P. Fraser.*

1142. Jensen, C. N. **Blossom infection by smuts.** Utah Acad. Sci. **1:** 106–113. 1918.—Paper presented to the Academy, April, 1913. A review of the work of Brefeld on infection processes in the Ustilagineae.—*D. Reddick.*

1143. Kunkel, L. O. **Further data on the orange rusts of Rubus.** Jour. Agric. Res. **19:** 501–512. *Pl. D (colored) and 92–94.* 1920.—See Bot. Absts. 7, Entry 367.

1144. Schweizer, Jean. **Die Spezialisation von Bremia lactucae Regel. [Specialization of B. l.]** Verhandl. Schweiz. Naturf. Gesell. **99:** 224. 1918.—Abst. in Zeitschr. Pflanzenkr. **30:** 24. 1920.

1145. Tochinai, Yoshihiko. **Studies on the food relations of Fusarium lini.** Ann. Phytopath. Soc. Japan **1**[3]: 22–33. 1920.—See Bot. Absts. 7, Entry 419.

1146. Treherne, R. C. **Synopsis Report of the Dominion Entomological Branch in British Columbia.** Dept. Agric. British Columbia Ann. Rept. **14:** 49–53. 1920. [Also Agric. Jour. British Columbia **5:** 25–29.]—Includes observations on insect carriers of fire blight (*Bacillus*

amylovorus). *Empoasca mali* and *Lygus pratensis* were shown to be carriers. "So far as early spring distribution is concerned, ants, honey-bees, click-beetles, apple aphis, and bark beetles are incriminated. Of the click-beetles, *Cardiophorus fenestratus* was observed commonly on the stumps of pear trees which had been cut down for blight and was seen to be feeding on blight exudate."—*J. W. Eastham.*

1147. Tubeuf, C. V. **Rückinfection mit Peridermium pini (Cronartium asclepiadeum) von der Schlangenwurz auf die Kiefer. [Infection with Peridermium pini (Cronartium asclepiadeum) from snake root to the pine.]** Naturwiss. Zeitschr. Forst- u. Landw. **18**: 99–101. 1920.—Infection was secured on the green shoot and primary needles of 2-year old pine seedlings with teliospores from *Cynanchum vincetoxicum* in August of 1915. At the end of September, 1919, the region beneath the lowest whorl of one of the pines was swollen and covered around with yellow bead-like pycnidial masses. The three upper internodes showed no infection.—*J. Roeser.*

1148. Wartenweiler, A. **Zur Biologie der Gattung Plasmopara. [Biology of the genus P.]** Verhandl. Schweiz. Naturf. Gesell. **99**: 223–224. 1918.—Abstract in Zeitschr. Pflanzenkr. **30**: 24. 1920.

1149. Wöber, A. **Die fungizide Wirkung der verschiedenen Metalle gegen Plasmopara viticola Berl. et de Toni und ihre Stellung im periodischen System der Elemente. [Fungicidal action of different metals on Plasmopara viticola.]** Zeitschr. Pflanzenkrankh. **30**: 51–59. 1920.

THE HOST (RESISTANCE, SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1150. Anonymous. **The red coloring matter of plant galls.** [Rev. of: M. Nierenstein. Trans. Chem. Soc. 1919 (cxv): 1328–1332.] Nature **104**: 707. 1920.—See Bot. Absts. 7, Entry 408.

1151. Bailey, C. H., and A. M. Gurjar. **Respiration of cereal plants and grains. V. Notes on the respiration of wheat plants affected with stem rust.** Jour. Biol. Chem. **44**: 17–18. 1920.—The rate of respiration of the infected plants was materially lower than that of the sound plants.—*G. B. Riggs.*

1152. Bertrand, Gabriel. **Action de la chloropicrine sur les plantes supérieures. [The effect of chloropicrine on the higher plants.]** Compt. Rend. Acad. Sci. Paris **170**: 858–860. 1920.—See Bot. Absts. 7, Entry 438.

1153. Boodle, L. A. **The scorching of foliage by sea-winds.** Jour. Ministry Agric. Great Britain **27**: 479–486. 1920.—A theoretical discussion of some of the literature bearing on the subject from which the general conclusion reached is "that the scorching of foliage by sea-winds is chiefly due to the drying action of the wind, but that salt may perhaps occasionally contribute towards the production of an injurious effect."—*M. B. McKay.*

1154. Brick, C. **Die Widerstandsfähigkeit gewisser Sorten unserer Kulturpflanzen gegen Parasiten. [The resistance of certain varieties of our cultivated plants to parasites.]** Naturwiss. Wochenschr. **18**: 391–394. 1919.—Susceptibility of plants to diseases is not due to degeneration, old age, and other similar causes enumerated by practical horticulturists, but usually is the result of certain differences in morphological or anatomical structures of the host itself. The increased acid and sugar content or tannin also have a bearing upon the resistance of a variety to parasites. Some plants escape because their season of blossoming or maturimg does not coincide with the development of the parasitic organism. These statements are supported by citations of literature dealing with susceptibility and resistance to *Tilletia tritici, Ustilago tritici, U. nuda, Puccinia glumarum, P. triticina, P. graminis, P.*

dispersa, P. malvacearum, Phytophthora infestans, Plasmopara viticola, Fusicladium dendritium, Sphaerotheca mors-uvae, Hemileia vastatrix, Chrysophlyctis endobiatica, Fusarium vasinfectum, F. tracheiphilum, F. niveum, and *Heterodera radicicola.—Charles Chupp.*

1155. Ehrenberg, P. **Der Einflusz des Bodens und der Düngung auf Pflanzenkrankheiten. [The effect of soil and manuring upon plant diseases.]** Fuhlings Landw. Zeitung **68:** 402–412. 1919.—A popular discussion touching on various soil conditions and various manurial additions to the soil that may directly or indirectly cause plant diseases.—*A. T. Wiancko.*

1156. Foëx, Et. **La nècrose du liber de la tige der pomme de terre atteinte de la maladie dite "de l'enroulement." [The necrosis of the wood of the stem of potato occurring in the disease called "leaf roll."]** Compt. Rend. Acad. Sci. Paris **170:** 1336–1339. 1920.—At the beginning of the necrosis there is first a pectic reaction with ruthenium red safranin, or carmin alum. Later there appears lignin and either cutin or suberin. It therefore appears that the disease is in the nature of a pectic degeneration.—*C. H. Farr.*

1157. Heinricher, E. **Zur Kenntnis der Verhältnisse zwischen Mistel und Birnbäumen. [Relation between mistletoe and pear.]** Zeitschr. Pflanzenkrankh. **30:** 41–51. *1 fig.* 1920.—In certain localities mistletoe occurs on pear trees very abundantly; in others it is exceedingly rare. An attempt is made to explain this contrast and especially the local frequency of the "pear mistletoe." It is emphasized that abundant development of the mistletoe on the main trunk of pear trees, particularly of younger trees, is most injurious. Several cases are referred to in which young bearing trees were killed through attacks by the mistletoe. In nature, however, attacks occur less frequently on young trees than on older ones. An infection of the main axis of young trees is not frequent. Mistletoe prefers tree tops. One case is related wherein a pear tree reacted most rapidly against a first infection with mistletoe. A second infection also failed at first, but developed later with considerable vigor. This case, the author states, is of interest, since it does not seem to permit of any other explanation, but that the reactions against seed and viscin of mistletoe are due to antagonistic action of the pear tree. The author suggests the possibility of the development of an "antitoxin" in the pear tree through the toxin of the mistletoe.—*H. T. Güssow.*

1158. Jodidi, S. L., S. C. Moulton, and K. S. Markley. **The mosaic disease of spinach as characterized by its nitrogen constituents.** Jour. Amer. Chem. Soc. **42:** 1061–1070. 1920.—See Bot. Absts. 7, Entry 442.

1159. Jodidi, S. L. **A mosaic disease of cabbage as revealed by its nitrogen constituents.** Jour. Amer. Chem. Soc. **42:** 1883–1893. 1920.—See Bot. Absts. 7, Entry 441.

1160. Levine, Michael. **The behavior of crown gall on the rubber tree (Ficus elastica).** Proc. Soc. for Experimental Biology and Medicine **7:** 157–158. 1920.—After summarizing briefly the present status of studies upholding the crown gall in its analogy to animal cancer, the author reports that "It was found that *Bacterium tumefaciens* inoculated into the apical internode of the branches, into the leaves or main stem of the rubber tree, *Ficus elastica*, stimulates the development of a neoplasm in the region of inoculation of a benign or malignant nature. The crown galls so formed, in this plant, are of two kinds, one in which growth is uniform and appears to be a swelling, the other is the characteristic convoluted type indicating a peripheral growth of isolated nodules. The crown gall in *Ficus elastica* after a number of months of active growth becomes hard and finally dies. This is associated with the differentiation of the tissue which converts the gall into a mass of parenchymatous cells and nodules of woody fibers. The central portion of the crown gall which generally lies near the wood cylinder disintegrates.—The invasion of the stem by the new growth does not destroy the entire conducting system of the stem, yet that portion of the stem above the gall dies as well as considerable portion of the stem below. Cultures made from pieces of the crown gall and stem above and below the gall yield only a schizomycete which in appearance is not unlike *Bacterium tumefaciens* and which when inoculated into the stems of young

geraniums and rubber plants produce crown galls in the region of inoculation. It is altogether possible that substances of the disintegrating crown gall or products of the crown gall forming organism are carried into the circulation of the stem and are responsible for the progress of the death of the stem from the gall upward and downward. The death of the plant due to crown gall is at least suggestive of the death caused by the invading and disintegrating malignant growths in animal cancer."—*G. H. Coons.*

1161. Losch, Hermann. **Notiz zur Ätiologie der Durchwachsungen bei Birnenfrüchten. [Etiology of leafy proliferation of pear fruits.]** Zeitschr. Pflanzenkrankh. 30: 71–73. *2 fig.* 1920.—A description of this teratological aberration, disputing Sorauer's explanation of cause as "over-nourishment" of the buds, and referring it as due to freezing of the primary normal buds. Secondary buds then develop during the time of maximum leaf production instead of at a period of low leaf formation, thus giving the leafy proliferation.—*H. T. Güssow.*

1162. Montemartini, Luigi. **Nuove osservazioni sopra l'azione eccitante del sulfate di rame sulle piante. [The stimulating action of copper sulfate on plants.]** Rev. Pathol. Veg. 10: 36–40. 1920.—See Bot. Absts. 7, Entry 1375.

1163. Opitz. **Fusariumbetall und Auswinterung verschiedener Winterweizensorten. [Fusarium blight and the over-wintering of various winter wheat varieties.]** Mittheil. Deutsch. Landw. Ges. 35: 488–489. 1920.—The author describes field plat experiments conducted at two different stations to determine the relation between *Fusarium*-infected winter wheat and winter injury. He planted 20 varieties, using the same varieties at each station. His germination results were uniformly good, running from 92 to 100 per cent. The vigor of the plants in early stages of development ranged from 79 to 99 per cent. Percentage of infection ranged from none at all to 77 per cent. It was expected that the experiments would show a relation between growth-vigor of host and severity of infection, but the results indicated no such relation. There was, however, some indication of varietal susceptibility, but the author purposely omitted the names of the varieties used, pending the time when more definite facts are made known concerning susceptibility of different wheat varieties. According to the experiments of the author there is a relation between severity of infection and overwintering ability of the host. This relationship, however, seems manifest only when growth conditions are peculiarly favorable to the development of the invading fungus. Seed treatment combined with careful selection of disease-free seed is recommended as a control measure. The author agrees with Hiltner in his recommendation of "uspulum" as a fungicide for prevention of the type of *Fusarium* infection described.—*H. B. Humphrey.*

1164. Petersen, Federico. **Los trigos seleccionados de la hacienda Amalucan. [Selected wheats.]** Rev. Agric. [Mexico] 5: 112–118. *4 fig.* 1919.—Rust due to one or more species of *Puccinia* causes heavy losses to Mexican wheat growers. Three selected varieties, Flor, Maravilla I, and Maravilla II, were found to be somewhat more resistant than the types ordinarily grown.—See Bot. Absts. 7, Entry 639.—*John A. Stevenson.*

1165. Rao, P. S. Jivanna. **The cause of spike in sandal (Santalum album).** Indian Forester 46: 469–487. 1920.—The spike disease of sandal is closely related to the parasitism of the plant and may depend upon the sap density of the parent plant. On plants with a high sap density, sandal has greater difficulty in maintaining itself than on species with low sap density; and in plants with a high oil content, the plants do better than where the oil is absent. With depleted water supplies in the host plants, haustoria may be unable to develop sufficiently rapidly to make up the deficit, and the unbalanced circulation comes about. The decreased water supply is accompanied by an increased deposition of starch owing to the absence of a sufficient amount of the transporting fluid. Spike is held not to be due to parasites on the sandal, but is regarded as an abnormal physiological reaction, and the remedy for the condition lies in the use of a strong host with high osmotic values. Lantavas and shrubs should be avoided because of their short lives and inferior quality as hosts, and the care of the host is of greater importance than the care of the parasite.—*E. N. Munns.*

1166. Reed, George M. **Varietal resistance and susceptibility of oats to powdery mildew, crown rust, and smuts.** Missouri Agric. Exp. Sta. Res. Bull. 37. *41 p.* 1920.—The resistance of oats, *Avena* spp., to powdery mildew (*Erysiphe graminis DC. f. avenae*), crown rust (*Puccinia coronata Corda*), loose smut (*Ustilago avenae* (Pers.) *Jens.*), and covered smut (*Ustilago levis* (*K & S.*) *Magn.*) was tested by inoculation experiments. Of 98 varieties and strains belonging to 14 species, tested with powdery mildew, negative results were obtained only with *Avena bromoides* and *A. sempervriens*. Vigorous infection occurred on all cultivated species. Of 132 strains and varieties belonging to 7 species, tested with crown rust, all were found susceptible, the least infection being 42 per cent, on *Avena brevis*. Of 154 varieties and strains belonging to 7 species tested with loose smut in the field during 5 seasons, *Avena brevis*, *Avena sativa* var. *nigra*, the variety Black Mesdag, and *Avena strigosa* gave consistently negative results; Burt, Early Ripe, Fulghum and other varieties of *Avena sterilis* gave very low percentages of infection, while the *Avena nuda* group proved entirely susceptible. One hundred and forty-six varieties and strains were tested with covered smut during four seasons, and in general they reacted to this test in the same way as they did to loose smut.—*L. J. Stadler.*

1167. Suematsu, Naoji, and Kikuji Kuwatsuka. **Studies on the varietal resistance of the peach to artificial inoculations with Gloeosporium laeticolor Berk.** Ann. Phytopath. Soc. Japan 1^3: 1–12. 1920.—Experiments in which 66 varieties of peach important in Japan were inoculated proved that none are resistant. Various degrees of susceptibility were found, and two varieties, Tachibanawase and Jitsugetsuto, which ripen early and possess good qualities, proved to be especially resistant. Seven other varieties, which possess somewhat less desirable qualities, are also especially resistant. Chinese species are generally more resistant than the Persian. No evidences of biologic forms of the fungus, nor of the phenomenon of "adaptation" were found.—*L. M. Massey.*

DESCRIPTIVE PLANT PATHOLOGY

1168. Anonymous. **Forestry, tree diseases and timber.** [Rev. of: Rankin, W. H. **Manual of tree diseases.** *XX + 398 p.* Macmillan & Co.: New York and London, 1918.] Nature **105**: 579. 1920.—"The first American text book on the subject. . . . . The account of *Keithia thuyina*, a dangerous fungus which has recently appeared in England on the valuable forest tree, *Thuya gigantea*, is of considerable interest."—*O. A. Stevens.*

1169. Anonymous. **Black scab in potatoes.** Jour. Dept. Agric. Ireland **20**: 238–241. *3 fig.* 1920.

1170. Anonymous. **Potato leaf-curl.** Jour. Ministry Agric. Great Britain **27**: 287–289. *2 fig.* 1920.—A brief popular description of potato leaf-curl, including a discussion of the cause and control.—*M. B. McKay.*

1171. Ball, E. D., and F. A. Fenton. **Potato leaf hopper and the leafburn.** Potato Mag. 2^{12}: 6–7. *2 fig.* 1920.

1172. Bewley, W. F. **"Damping off" of tomato seedlings.** Jour. Ministry Agric. Great Britain **27**: 670–673. 1920.—An abridged account of an investigation to be published in full in the Annals of Applied Biology, vol. 7, No. 2, 1920.

1173. Birmingham, W. A. **Crown gall of fruit trees.** Agric. Gaz. New South Wales **31**: 717–718. *3 fig.* 1920.—A brief description of the disease is given with suggestions as to preventive measures. Destruction of the diseased tree is recommended. Grafts may be treated with bluestone paste before planting.—*L. R. Waldron.*

1174. Birmingham, W. A. **Root rot of fruit trees due to Armillaria mellea.** Agric. Gaz. New South Wales **31**: 669–673. *4 fig.* 1920.—The appearance of various varieties affected by the disease, methods of dissemination, effect of the disease and control measures are given. "Bluestone paste" may be applied to cut root surfaces after the necessary root pruning has been done.—*L. R. Waldron.*

1175. Bisby, G. R., and A. G. Tolaas. **Potato diseases in Minnesota.** Minnesota Agric. Exp. Sta. Bull. 190. *44 p., 27 fig.* 1920.—The most common potato diseases with control measures are discussed. The use of certified seed and seed plot methods are urged in order to keep up vigor. Soil management and cultural directions are given. Suggestions are also given regarding methods of handling and storing.—*A. C. Arny.*

1176. Brandes, E. W. **Mosaic disease of corn.** Jour. Agric. Res. **19**: 517–521. *Pl. 95–96.* 1920.—Maize (*Zea mays*) is subject to the same mosaic disease as sugar cane and certain wild grasses. The disease on maize has been noted particularly in sugar cane regions of southern United States and in Porto Rico. The symptoms are essentially like those of sugar cane mosaic. Seed production is suppressed. *Aphis maydis* transmits the "virus."—*D. Reddick.*

1177. Cobb, N. A. **A newly discovered parasitic nematode (Tylenchus mahogani n. sp.) connected with a disease of the mahogany tree.** Jour. Parasitology **6**: 188–191. *3 fig.* 1920.—Technical description of a new species of nematode parasitic in the tissues of the bark of the mahogany (*Swietenia mahogani*) in the Barbados.—*E. A. Bessey.*

1178. Cromwell, R. O. **Fusarium blight of the soy bean and the relation of various factors to infection.** Nebraska Agric. Exp. Sta. Res. Bull. 14: 1–43. *5 fig.* 1919.—Investigations carried on in North Carolina and Nebraska. This disease was first reported by author in Jour. Agric. Res. **8**: 421–440. The following conclusions were reached: The blight is characterized by a chlorosis and shedding of the leaves or leaflets, followed by the death of the plants. Soy bean blight has been observed in several localities within North Carolina on soils infected with cowpea wilt. What is probably the same disease has been recently observed by others in Alabama and possibly in Wisconsin. *Fusarium tracheiphilum* (section Elegans) is the causal organism. Cultural and morphological studies which are regarded as of primary importance in distinguishing species of *Fusarium* show that the strain of *Fusarium* on soy bean is identical with the organism producing the wilt of cowpeas. Reciprocal inoculation experiments in field and greenhouse with the strains from soy beans and cowpeas show that cross-inoculations can be made. Physical structure and acidity of soil under natural conditions are not the limiting factors in infection, but acidity under certain conditions may have some influence. Infection occurs through the roots, but nematodes appear not to increase the percentage of blight materially. Other organisms, such as Rhizoctonia and *Sclerotium rolfsii*, and other root injuries are believed to materially increase the percentage of diseased plants in the field. The Black Eyebrow variety of soy beans shows some evidence of resistance. The Brown variety, while not resistant, is tolerant and seems to develop remarkably well in spite of numerous fungous filaments and nematodes within the roots. Fifteen other varieties tested were severely affected. Velvet beans are not subject to infection.—*T. A. Kiesselbach.*

1179. Cunningham, G. H. **Mortality among stone fruit trees in Central Otago.** New Zealand Jour. Agric. **20**: 359–364. 1920.—See Bot. Absts. 7, Entry 961.

1180. Darnell-Smith, G. P. **"Bunchy-top" in bananas.** Agric. Gaz. New South Wales **31**: 583–584. 1920.—Description of internal lesions of this disease is given. Growers are advised to avoid planting any plants showing such lesions and to destroy growing plants showing bunchy-top characters. The organism responsible, if any, has not been determined. Bacteria have been isolated from diseased tissues, and a *Fusarium* has been found. It is not known with certainty that the disease is infectious.—*L. R. Waldron.*

1181. Dastur, J. F. **Choanephora cucurbitarium (B, and Rav.) Thaxter, on chillies (Capsicum spp.).** Ann. Bot. **34**: 399–403. *Pl. 19.* 1920.—A new disease of chillies is described which caused a considerable amount of damage north of the Ganges, India, in 1917. The characters of the fungus causing the disease are given.—*W. P. Fraser.*

1182. Dickson, B. T. **Some plant diseases in the greenhouse.** Ann. Rept. Quebec Soc. Protection of Plants **12**: 46–48. 1920.—A brief account of the most important plant pathogenes occurring in the greenhouses at Macdonald College, Quebec, Canada. Those discussed were: *Uromyces carophyllinus* on carnation, *Puccinia antirrhini* on snapdragon, *Microsphaera alni* on sweet pea, *Alternaria violae* on violet, *Cladosporium fulvum* on tomato. Mosaic of tomato and a mosaic-like affection of Cineraria were also considered.—*B. T. Dickson.*

1183. Eastham, J. W. **Notes on potato diseases.** Agric. Jour. [British Columbia] **5**: 210. 1920.

1184. Eastham, J. W. **Bitter-Pit or Baldwin Spot.** Agric. Jour. [British Columbia] **4**: 292. 1919.

1185. Eastham, J. W. **Guard against Apple Powdery Mildew.** Agric. Jour. [British Columbia] **4**: 44. 1919.

1186. Fischer, W. **Die Brennfleckenkrankheit der Bohnen. [The anthracnose of beans.]** Fuhlings Landw. Zeitung. **68**: 241–259. 1919.—A popular review of the literature of the anthracnose of beans caused by *Gloeosporium lindemuthianum*, covering its nature, conditions of infection and development, and various methods of treatment. The author also discusses some experiments conducted by himself and others at Bromberg in 1915 and 1916, in which seed from apparently disease-free plants in rows in which diseased seed had been interspersed was selected for planting the following year to see if immune plants could be found. The result was 23 per cent infected plants as against 63 per cent infected plants in rows planted from infected plants of the year before. In 1917 and 1918 tests of selections of disease-free seed from apparently disease-free plants were made on a field which had never grown beans and was located far from the previous trial grounds. There was considerable reduction in disease but still as much as 20 per cent, with an average of 8.2 per cent. This method of getting rid of the disease is not regarded as very promising. The selection of disease-free seed from immune plants in badly diseased fields seems more promising. It is suggested that crossing of different species of beans or beans with related plants may be worth trying; to support this suggestion, attention is called to the observations of several investigators who found that species differed in susceptibility to the disease.—*A. T. Wiancko.*

1187. Hemmi, Takewo. **Kurze Mitteilung über drei Fälle von Anthraknose auf Pflanzen. [Short report on three cases of anthracnose of plants.]** Ann. Phytopath. Soc. Japan **1**[3]: 13–21. *Pl. 1, 5 fig.* 1920.—Anthracnoses of *Mahonia japonica* (Thumb.) DC., *Linum usitatissimum* L., and *Illicium anisatum* L., occurring in Japan, are briefly discussed. The cause of the leaf spot of *Mahonia* was found to be a new species of *Colletotrichum*, the author giving it the name *Gloeosporium* (*Colletotrichum*) *japonicum*. The pathogene attacking stems and cotyledons of flax is identical with *Colletotrichum linicolum* described by Pethybridge and Lafferty. The leaf spot of *Illicium* is caused by a new species, *Gloesporium Illicii* H. Symptoms of the three diseases and technical descriptions of the two new species are given.—*L. M. Massey.*

1188. Hiley, W. E. **The fungal diseases of the common larch.** *XI + 204 p., 73 fig.* Clarendon Press: Oxford, 1919.—This book opens with a description of the general anatomy of the larch, in which the author defines technical terms which he uses later. The discussion falls under 4 heads: (1) larch canker, *Dasyscypha calycina;* (2) *Fomes annosus*, and other less important heart-rotting fungi; (3) *Armillaria mellea;* (4) leaf and seedling diseases. Approximately 150 pages are given to the discussion of *Dasyscypha calycina*, *Fomes annosus*, and *Armillaria mellea*. Other heart-rotting fungi—*e.g.*, *Polyporus schweinitzii*, *Poria vaporaria*, *Polyporus sulphureus*, and *Trametes pini*—are less important than *Fomes annosus* on larch. The leaf and seedling diseases are not important except under unfavorable conditions, or in nurseries where alternate hosts of the needle rusts are not excluded. The author describes the injury resulting from attack by a given fungus, the relations of host and parasite, the fungus

itself, pure culture experiments, artificial infection, natural infection, and methods of prevention. The researches of Hartig and Brefeld are reviewed critically in the light of extensive recent field observations and experiments, and the author is of the opinion that *Dasyscypha calycina* enters its host by way of dead branches or branch stubs, *Fomes annosus* through dead roots, and *Armillaria mellea* through damaged or dead roots. The importance of small wounds may have been greatly overestimated. Hard subsoil conditions in cultivated fields are particularly unfavorable to the first rotation of larch planted on such sites, because the tap roots, being unable to penetrate the subsoil, soon die; and *Fomes annosus* almost inevitably attacks these dead roots. First-rotation larch should be planted in mixed stands—*e.g.*, with hardwoods—so that the roots of the latter may break up the subsoil, speed up aeration, and render conditions more favorable for the larch roots. Reasons for the various control methods suggested are thoroughly discussed. The author closes with a general summary of the important points brought out in the book.—*Reginald H. Colley.*

1189. Houser, True. **Root rot of tobacco.** Monthly Bull. Ohio Agric. Exp. Sta. 5: 232. 1920.—A short discussion of symptoms of the disease, influence of soil and water, character of soil in plant beds, and methods of control is given.—*R. C. Thomas.*

1190. Kawakama, Koichiro, and Suehiro Yoshida. **Bacterial gall on Milletia plant. (Bacillus milletiae n. sp.).** Bot. Mag. Tokyo 34: 110–115. *Pl. 2.* 1920.—In Japan the authors found that this organism causes rough, irregular, round galls from 5 mm. to 10 cm. in diameter on the stems of *Milletia floribunda.* It is a motile organism about 2.1 + 0.6 microns, with 7 or 8 peripheral flagella; it produces no spores and is gram negative.—*Leonas L. Burlingame.*

1191. Killian, Karl. **Ueber die Blattfleckenkrankheit der Tomate hervorgerufen durch Septoria lycopersici. [Leaf spot of tomato (Septoria lycopersici).]** Zeitschr. Pflanzenkrankh. 30: 1–17. *7 fig.* 1920.—The following constitutes the author's summary: Spring infection with Septoria takes place exclusively through ejection of pycnospores from previous year's infected leaf. Infection may be recognized in the moist chamber after five days by browning and dropping off of the cotyledons. Eight days later spots appear at first on the lower leaf surface; these when dry exhibit fruiting bodies. Similarly the young stems and older stems, but not the fruits (!) are affected. The incubation period is directly related to weather conditions. Artificial cultures indicate that *Septoria* is readily grown on various nutrient materials. Vegetative development is favored by presence of sugar. Fruit bodies develop only after vegetative development is arrested. The fungus penetrates the epide mis, later the intercellular spaces, destroys the tissues of the lower-leaf surface, and finally the upper surface becomes involved. Lastly its offensive action becomes weakened. In cases of severe attack the diseased foliage should be burned in the fall and the surrounding soil dug deeply. Compost which has come into contact with diseased plant remains should be avoided. Rotation is recommended, using plants not subject to attack.—*H. T. Güssow.*

1192. Lo Priore, G., and G. Scala. **L'arrossamento delle foglie del Sommaco. [The reddening of the leaves of sumac.]** Staz. Sper. Agrarie Ital. 52: 227–237. *Pl. 7–8.* 1919.

1193. Lutman, B. F. **Tip burn of the potato and other plants.** Potato Mag. 3^2: 6–7, 20, 22–24; 3^2: 12, 20–21. *1 fig.* 1920.—Reprint of Vermont Agric. Exp. Sta. Bull. 214.

1194. Molliard, M. **Tumeurs presentées par les racines du Chou-Rave et de la Betterave. [Tumors occurring on the roots of kohl-rabi and beet.]** Bull. Soc. Path. Veg. France 7: 17–19. 1920.—Large tumor-like outgrowths were found on the roots of kohl-rabi and beets in different parts of France. In some cases they arose from the main root and in others from secondary roots. Those on kohl-rabi were at first thought to be caused by *Plasmodiophora brassicae,* but a histological study failed to show any evidence of this. The tumors found on beets were very similar in structure and appearance to those on kohl-rabi. Mycelium of a *Fusarium* was found on the surface of the tumor on the beet, but is not believed

to have any causal relation to the tumor. The possibility of this malformation being caused by the crown gall organism or by other parasites or insects is discussed, and it is concluded that the tumors are the result of some form of parasite not yet determined.—*C. L. Shear.*

1195. Nowell, W. **The red wing or root disease of cocoanut palm.** Tropic. Agric. **54:** 240–245. 1920.

1196. Nowell, W. **Root disease of cacao.** Jour. Jamaica Agric. Soc. **24:** 173–174. 1920. —A partial reprint from Bull. Dept. Agric. Trinidad and Tobago 18. 1920.

1197. Nowell, W. **Mosaic disease of sugar-cane.** Agric. News [Barbados] **19:** 14. 1920. —A review of Bulletin 829 of the U. S. Department of Agriculture, by E. W. Brandes, and of Bulletin 19 of the Insular Experiment Station, Rio Piedras, Porto Rico.

1198. Pachano, Abelardo. **El mildew de la viña. [Downy mildew of the grape.]** Quinta Normal Estac. Exp. Circ. 9. *8 p.* Ambato, 1918.—Introductory note by Martínez states that grapes are raised in quantity only in a small part of the Province of Tungurahua, but that conditions are such that grape growing might be greatly extended. Variety tests are being conducted. The variety "White Muscatel of Alexandria" does not ripen at the "Quinta Normal," but should do well in the valley of Patata. A summary of the symptoms, cause, and control of the downy mildew caused by *Plasmopara viticola* is given. It is believed that it was introduced from North America eight or ten years previously.—*F. M. Blodgett.*

1199. Pachano, Abelardo. **Dos enfermedades de las papas. [Two diseases of potatoes.]** Quinta Normal Estac. Exp. Circ. 7. *11 p.* Ambato, 1918.—Discusses symptoms, cause, and control of late blight caused by *Phytophthora infestans* and early blight caused by *Alternaria solani.* In the comparatively dry climate about Ambato, the early blight is much the more serious, and spraying with bordeaux mixture gave poor results.—*F. M. Blodgett.*

1200. Pole, Evans, I. B. **Anthracnose or zwart roest of the grape (Gloeosporium ampelophagum, Sacc.)** South African Fruit Grower **7:** 219. *Pl. 1–2.* 1920.

1201. Puttemans, A. **Une nouvelle maladie de la vigne.—L'arrachement des grappillons. [A new grape disease.—Pulling off of the grapes.]** Bull. Soc. Path. Veg. France **7:** 34–36. *Fig. 1.* 1920.—The Isabella grape (*Vitis labrusca*) in Brazil has recently shown a diseased condition in which the grapes are partially torn from the rachis; they then become livid and shrivel up. Other grapes immediately surrounding the first soon become diseased and finally fall off; this suggests a parasitic disease spread by contact. But no parasitic organism has yet been found. In some cases one-third or even one-half of the grapes are destroyed by this disease. The author thinks that the trouble may be due to certain climatic conditions, especially to the sudden variations in temperature, which amount to as much as 30 or 40 degrees C. in 24 hours. Heat and humidity may be able to cause so great disturbance in the activities of the plant as to produce these results. The most compact bunches are affected. The berries grow to abnormal size and crowd each other until some are torn loose by the pressure. —*C. L. Shear.*

1202. Ramirez, Roman. **Enfermedad de los arboles de limon. [A lemon disease.]** Rev. Agric. [Mexico] **5:** 278–279. *1 fig.* 1919.—A leaf spot due to *Cladosporium* sp. and *Macrosporium* sp.—*John A. Stevenson.*

1203. Spaulding, Perley. **Scientific research in 1919 conducted by the Office of Investigations in Forest Pathology.** Report on white pine blister rust control in 1919. Amer. Plant Pest Committee Bull. **4:** 10–11. 1920.—The author reports experimental work on *Cronartium ribicola* by H. H. York at North Conway, New Hampshire, and L. H. Pennington at Lewis, New York viable aeciospores have been caught in traps after having been blown for a distance of 15 or 20 miles and carried upward 5000 feet. Viable urediniospores were caught up to a

distance of 3200 feet from their source. Similar spores caught at a distance of 3400 feet failed to germinate. Viable sporidia were caught in shrubbery up to a distance of 75 feet from their source and 600 feet in an open meadow. Those caught 2400 feet away failed to germinate. Longevity of sporidia is less than 10 minutes with humidity at 90 and temperature of 22–25°C. In other experiments viable sporidia were caught at distance of 180 feet, and those at 300 feet did not germinate. In nine areas where the source of sporidia was localized it was proved that serious infection of pines occurred up to less than 200 feet from the currants. Surgical treatments of diseased pines have shown that where the cut was made at least one and one-half inches back from the visibly affected part, the eradication was successful.—*W. H. Rankin.*

1204. Stakman, Louise J. **A Helminthosporium disease of wheat and rye.** Minnesota Agric. Exp. Sta. Bull. 191: *24 p., 5 pl.* 1920.—A disease of wheat due to a *Helminthosporium* causes foot rot in seedlings, and death of the seedlings often results. Secondary infections often occur on any part of the plant, including the seeds, above ground. The common wheat, durum, club, emmer, einkorn, and rye, and many other grasses were found susceptible. The organism is carried on the seed and is not destroyed by formaldehyde treatments. Control measures consist in using seed from uninfected fields, and in following good cropping methods.—*A. C. Arny.*

1205. Taubenhaus, J. J. **Diseases of greenhouse crops.** *x + 429 p. 82 pl.* Dutton and Co.: New York City, 1920.—In this book "intended as a guide to practical growers, teachers, students and investigators in plant pathology," the author aims to "bring together available information on the subject and to place it at the disposal of the greenhouse men." Following a statement that the total value of forced plants and flowers, as estimated for 1909, was $24,930,000, it is pointed out that a conservative estimate, however, may place these losses (from plant disease) at about 30 per cent.—The book is divided into six parts, under the following heads: (1) The soil, healthy and "sick;" (2) Cultural considerations, in which breaking the rest period of plants is included; (3) Diseases of greenhouse vegetables (includes also mushrooms); (4) Diseases of ornamentals; (5) Greenhouse pests, under the topics plant pests (red spiders and mites) and thrips (includes also mealy bugs, scale insects, white fly, aphids, soil insects, ants, millipeds, sow bugs, slugs, etc.); (6) Methods of control, in which are outlined methods of preparing insecticides and fungicides, methods of fumigation (with burning sulphur and cyanides) and hygienic considerations. Sections (4) and (5) make up the bulk of the book, and here the diseases are briefly discussed, and literature citations made. The book terminates with a simple glossary of technical words.—*G. H. Coons.*

1206. Traverso, G. B. **La "lebbra" ed il "vaiolo" del Sommaco. [The "lebbra" and the "vaiolo" of the Sumac.]** Staz. Sper. Agrarie Ital. 52: 213–226. *Pl. 5 (col.) and 6.* 1919.

1207. Van der Bijl, P. A. **A leaf spot of the peanut or monkeynut plant caused by the fungus Septogloeum arachidis Rac.** Jour. Dept. Agric. Union of South Africa 1: 528–530. *Fig. 1–2.* 1920.—This disease has been noticed especially along the Natal coast, and occasionally becomes sufficiently serious to warrant the application of a protective spray.—*E. M. Doidge.*

1208. Waters, R. **Take-all disease in wheat.** New Zealand Jour. Agric. 20: 137–143. *3 fig.* 1920.—The disease is extremely destructive in Australia, and has evidently been present in New Zealand for some years. The fungus (*Ophiobolus graminis*) is found upon typically affected plants. Fruiting bodies of the fungus have been identified. Inoculation experiments have not been conducted. Diseased plants usually occur in circular or oval patches. The plants are stunted, more or less bleached, and finally show black masses of the fungus on the underground parts. A similar dwarfing of the plants may be due to crowding by weeds, but in such cases there is no bleaching. Water-logged soil, and the grass grub (*Odontriae zealandica*) also cause dwarfing, but the presence of the black mycelium of *Ophio-*

lobolus late in the season will distinguish this disease. Other susceptible hosts are *Hordeum sativum, Secale cereale, Hordeum murinum, Bromus sterilis, and Agropyron repens.* Control measures suggested are burning of stubble, rotation, deep tillage and heavy applications of lime. Good drainage is an important factor in control, and the land must be kept free from susceptible plants.—*N. J. Giddings.*

1209. Waters, R. **Take-all disease in wheat.** New Zealand Jour. Agric. 20: 287–288. 1920.—Cultures of *Ophiobolus graminis* were secured from ascospores. On standard agar the mycelium was white. There was no evidence of fruiting in culture. Wheat plants from disinfected seed grown in sterilized soil were inoculated by placing near the plant a bit of medium containing the fungus. Four inoculated plants died in from 28 to 36 days, while controls were in good condition at the end of 58 days. Re-isolations were secured from the rootlets of some of the dead plants. Several other methods of inoculation gave no infection.—*N. J. Giddings.*

1210. Welten, Heinz. **Pflanzenkrankheiten.** [**Plant diseases.**] *199 p., 5 pl., 76 fig.* Phil Reclam, Jr.: Leipzig, 1919.

1211. Whipple, O. B. **Degeneration in potatoes.** Montana Agric. Exp. Sta. Bull. 130. *29 p., 16 fig.* Apr., 1919.—The results are given from five-years' work upon potato projects. Degeneration includes various potato ailments which are not, so far as known, traceable to the attacks of parasitic organisms, and includes spindle sprout, curly dwarf, and probably mosaic and leaf roll. Characteristic symptoms are the loss of vigor of the plant, and a corresponding loss in yielding power. For control it is necessary to turn to seed selection and better cultural methods. In the experiments the plots were planted on the tuber-unit and tuber-line plan. Regarding spindle sprout and yellow top, probably a stage of spindle sprout, the deterioration is apparently sudden and complete, and may be brought about by improper storage of the tubers or unfavorable growing conditions.—Curly-dwarf is the most serious condition. It is a gradual deterioration; the transition from normal to curly dwarf covers a period of two, three, or more seasons. Supposed mosaic degenerates have in their behavior resembled typical curly-dwarfs and are in this paper so considered. The first indications of curly dwarf are a slight crinkling and reduction in the size of the leaf. A plant showing the above foliage symptoms would be classed as an intermediate. Experiments prove that intermediates of one season are, as a rule, the curly dwarfs of the next. Tubers from curly-dwarf vines if planted produce no marketable tubers. Tubers from degenerate types are, as a rule, shallow-eyed, when compound with those from normal vigorous plants, and efforts to improve the type of tubers by the selection of shallow-eyed seed tubers should be undertaken, according to the author, with extreme caution.—*H. E. Morris.*

1212. White, E. W. **Apple-tree Anthracnose or Black Spot Canker.** Agric. Jour. [British Columbia] 4: 206–207. 1919.

1213. Wolf, F. A. **Report of the Division of Plant Pathology and Bacteriology.** North Carolina Agric. Exp. Sta. Ann. Rept. 42: 65. 1920.—Subject matter of this report is covered in bulletin on clover stem rot in: North Carolina Agric. Exp. Sta. Bull. 16: 15–18. *3 pl.* 1919. [See Bot. Absts. 3, Entry 1669.]—*F. A. Wolf.*

ERADICATION AND CONTROL

1214. Anonymous. **La "anthracnosis" de la vid.** [**Anthracnose of the grape.**] Informacion Agric. [Madrid] 10: 153. 1920.—Treatment for grape anthracnose (*Gloeosporium ampelophagum*).—*John A. Stevenson.*

1215. Anonymous. **Tumores bacterianos.** [**Bacterial tumors.**] Informacion Agric. [Madrid] 10: 170–171. *2 fig.* 1920.—The nature and control of the olive knot disease due to *Bacterium savastanoi*).—*John A. Stevenson.*

1216. Anonymous. **Control of silver blight.** New Zealand Jour. Agric. 20: 374–377. 1920.—The experiments deal principally with stone fruits. The treatments include tests with a number of fertilizers, with lime, and with copper sulphate and Bordeaux mixture. The only materials which appeared to be of any possible value were the copper sulphate and the Bordeaux mixture.—*N. J. Giddings.*

1217. Anonymous. **Spraying calendar for apples in North Carolina.** North Carolina Agric. Ext. Service Circ. 101. *4 p.* 1920.—Directions for spraying apples to prevent attacks by insects and plant diseases.—*F. A. Wolf.*

1218. Beck, Olga. **Über eine Methode der Saatgutuntersuchung auf Brand und über das Versagen der Kuperfvitriolbeize.** [**A method of testing wheat for smut contamination and possible omission of the blue vitriol disinfection.**] Naturwiss. Zeitschr. Forst-u. Landw. 18: 83–99. 1920.—The author describes an original method for determining arithmetically the number of smut spores in any sample, and from this predicting the percentage of infection likely to result in the subsequent crop. Under certain conditions seed treatment may be safely omitted.—*J. Roeser.*

1219. Bisby, G. R., and A. G. Tolaas. **The use of Bordeaux mixture for spraying potatoes.** Minnesota Agric. Exp. Sta. Bull. 192. *31 p., 4 fig.* 1920.—Bordeaux mixture is a preventive of late blight in potatoes. It also reduces the injury from other leaf diseases and repels certain insects. A 5–5–50 mixture has been found better than weaker ones. The indications are that spraying may result in the production of more vigorous tubers.—*A. C. Arny.*

1220. Blair, R. E. **The work of the Yuma reclamation project experiment farm in 1918.** U. S. Dept. Agric. Dept. Circ. 75. *77 p., 32 fig.* 1920.—Preservative treatments for willow posts.

1221. Braun, Harry. **Presoak method of seed treatment; a means of preventing seed injury due to chemical disinfectants and of increasing germicidal efficiency.** Jour. Agric. Res. 19: 363–392. *Pl. 69–82. 9 fig.* 1920.—Full experimental data in support of conclusions previously published.—See Bot. Absts. 3, Entry 2576.—*D. Reddick.*

1222. Bryce, P. I. **Can we improve potato storage?** Ann. Rept. Quebec Soc. Protection of Plants 12: 53–59. 1920.—The article deals with statistics showing the importance of the crop in Canada, the chief storage rots, and suggestions on storing potatoes both in small and large lots.—*B. T. Dickson.*

1223. Coons, G. H. **Safeguarding next year's wheat.** Michigan Agric. Exp. Sta. Quart. Bull. 3[1]: 9–11. 1920.

1224. Detwiler, Samuel B. **White pine blister rust control in 1919.** Amer. Plant Pest Committee Bull. 4. *10 p.* 1920.—A summary of the proceedings of the fifth annual International Blister Rust Conference held at Albany, New York, on December 8–9, 1919. As the result of four-years' field work it is now proved that white pine blister rust (*Cronartium ribicola*) can be controlled locally if the currant and gooseberry bushes are destroyed within 200–300 feet of the pines. It has been proved that unskilled laborers with trained supervision remove on the average 95 per cent of the bushes in the first working of an area. It has been found that *Ribes* does not multiply rapidly in an eradication area, and a second eradication does not seem necessary for five or ten years after the first. No new pine infections were found in 1919 on four control areas carefully examined. The labor costs per acre for eradication in the New England States average between 24 and 42 cents. The number of pines that are affected in the New England States is said to be increasing rapidly. On an area of 72 square miles in New Hampshire it was estimated that one-fourth of the pines are affected. The Conference believes that it is necessary in the infected regions for white pine owners to

destroy currants and gooseberries within 200 feet of the pines if they are to save the pines. The rust has not been found in Western United States, and the existing quarantines are considered a safeguard. The resolutions adopted urgently recommend that the destruction of the currants and gooseberries in white pine stands be adopted generally in infected regions; that pine and currant growing regions be segregated by law; that the cultivated black currant be outlawed; that state and federal experimental work be continued; that scouting in the western states be continued; and that an accurate census of the white pine in the country be made by the federal government. The experimental and practical control work done on control areas in the various states is summarized by states. No blister rust was found on pines in 1919 outside the New England States, New York, Minnesota, and Wisconsin.—*W. H. Rankin.*

1225. Ducomet, V. **De la lutte contre le Phytophtora infestans. [Combating Phytophtora infestans.]** Bull. Soc. Path. Veg. France 7: 59–65. 1920.—The principal work carried on in different countries in the prevention of late blight of potato is reviewed. In the author's region—Grignon—four applications of Bordeaux mixture are sufficient in the worst seasons, and usually two suffice.—*C. L. Shear.*

1226. Dutton, W. C. **Dusting and spraying experiments of 1918 and 1919.** Michigan Agric. Exp. Sta. Special Bull. 102. *50 p., 20 fig.* 1920.—Comparative dusting and spraying experiments with fungicides and insecticides were carried on in 1918 and 1919 in several orchards in various parts of Michigan, the fruits being apple, cherry, plum, peach and currants. A few experiments were also made with potatoes. For apples, the scab was as well, and in some cases better, controlled by the sulphur dust than by the lime-sulphur spray. Dry lime-sulfur dissolved in water and sprayed gave poor control, as did barium tetrasulphide (B. T. S.). The latter caused russeting of the fruit in some varieties. The lime-sulphur sprays injured the leaves a little, while the sulphur dust did no harm. Of the insecticides, lead arsenate gave uniformly good results. Calcium arsenate burned the foliage somewhat and gave only fair control of coddling moth. Magnesium arsenate, on the contrary, was unsatisfactory as a control and caused serious burning. On cherries, dusting with sulphur (90 parts) and lead arsenate (10 parts) did not control, although it delayed for about two weeks the onset of leaf blight (*Coccomyces hiemalis*). The trees were badly defoliated by the middle of September. The trees sprayed with lime-sulphur (plus arsenate of lead) remained free from the disease until late in September, more than two months after the last spraying, when a small amount of infection occurred. In the same orchard the dusted and check trees showed serious loss from *Coniothyrium*, which caused cankers at the point of attachment of the fruit pedicel, causing the drying up of the fruit. The sprayed trees did not show this trouble. Other spraying and dusting experiments with cherry and plum were inconclusive because of lack of insect and fungous trouble in the unsprayed plots. For leaf curl (*Exoascus deformans*) of the peach the 90–10 dust mixture (sulphur and lead arsenate) applied March 7 was practically of no value. The Niagara soluble sulphur was only very slightly better. The dry-lime-sulphur dissolved and applied as a spray showed much better results than the dust treatments, but still did not give good control. Magnesium arsenate as an insecticide caused almost complete defoliation of the peach. Currants sprayed with bordeaux mixture remained healthy throughout the season; those dusted and those sprayed with lime-sulphur showed yellowing of the leaves and lost much foliage. Bordeaux mixture controlled the anthracnose (*Pseudopeziza ribis*) successfully. The other treatments reduced the anthracnose but did not control it. Of the varieties tested, the untreated bushes showed great variation in susceptibility to anthracnose. Prince Albert is very resistant; London Market resistant, Wilder, Perfection, Fay's Prolific, La Versailles, Cherry and Red Cross are susceptible; and Red Dutch is very susceptible. With potatoes, calcium arsenate applied as a dry dust (85 parts with 15 parts of talc as a filler) or sprayed on at the rate of 1½ lbs. in 50 gallons give equally perfect control of the Colorado potato beetle.—*E. A. Bessey.*

1227. Evans, N. H. **Report on experiments for the control of Apple Scab.** Ann. Rept. Dept. Agric. (British Columbia) **14**: 25–27. 1920.

1228. Ewert. **Brauchbare Ersatzmittel für altbewährte Mittel zur Abwehr von Pflanzenkrenkheiten im Obst- und Gartenbau. [Useful substitutes for well-known mixtures in the control of plant diseases in orchard and garden.]** Illust. Schlesische Monatsschr. Obst-, Gemüse- und Gartenbau **1918**: 96–97. 1918.

1229. Gossard, H. A. **Dust spraying.** Monthly Bull. Ohio Agric. Exp. Sta. **5**: 147–149. 1920.—This is a report of tests during 1916–1917 comparing dusting with liquid applications and giving the respective costs.—*R. C. Thomas.*

1230. Hardenburg, E. V. **Potato inspection in New York in 1919.** Potato Mag. 2^{12}: 9, 38. 1920.

1231. Hiltner, L. **Ueber die Beizung des Wintergetreidesaatguts. [On the treatment of winter-wheat seed.]** Mitteil. Deutsch. Landw. Ges. **35**: 486–487. 1920.—The Agricultural Institute in Munich has worked for the development of an organization involving the employment of inspectors charged with the duty of instructing farmers in the details of seed treatment and enforcing the requirements that all seed be treated. The author recommends "fusariol" as a practical fungicide for prevention of bunt (*Tilletia* sp.), and adds that its use results in improved stand and yield. He compares "fusariol" with formaldehyde, "uspulum," "fusafine," and a new fungicide, "sublimoform." The author warns against the use of copper sulphate because of injurious effect on germination. For control of barley stripe disease (*Helminthosporium graminium*) he recommends a 0.25 per cent solution of "uspulum" as the most satisfactory of fungicides employed in his experiments. In the prevention of *Fusarium* infection in rye the author obtained best results as to stand and yield when he used fusariol. Very satisfactory results were obtained also from the use of "uspulum."—*H. B. Humphrey.*

1232. Howard, W. L. **Brown rot of apricots and its prevention.** Better Fruit 15^1: 7. 1920.

1233. Hunt, E. C. **Report of Assistant Horticulturist and Inspector of Fruit Pests, East and West Kootenay districts.** Ann. Rept. Dept. Agric. (British Columbia) 14: 36–39. 1920. —Spraying for control of apple scab with (1) Bordeaux mixture containing excess of lime, "soluble sulphur" being used for the calyx spray, (2) lime-sulphur solution, and (3) sulphur dust. The first gave best control, and in the case of McIntosh Red, a slightly greater yield than lime-sulphur. Sulphur dust gave very poor control, 86.95 per cent of the fruit of McIntosh Red being scabby.—*J. W. Eastham.*

1234. Johnson, A. G., and J. G. Dickson. **Stem rusts of grains and the barberry in Wisconsin.** Wisconsin Agric. Exp. Sta. Bull. 304. *16 p., 6 fig.* 1919.—A general statement of the relation of the common barberry to the spread of the stem rust (*Puccinia graminis*) of cereals and grasses. The difference between the stem rust and leaf rust is explained by photographs, and a chart shows the extent of spread of the stem rust from an infected barberry hedge.—*E. M. Gilbert.*

1235. Laffer, H. E. **Bordeaux powders vs. home-made bordeaux mixtures.** Agric. Gaz. New South Wales **31**: 595. 1920.—Trials with proprietary Bordeaux powders showed them to be ineffective in controlling grape downy mildew.—*L. R. Waldron.*

1236. Leiby, R. W. **Spraying Irish potatoes.** North Carolina Agric. Ext. Serv. Circ. 103. *14 p.* 1920.—A popular treatment of subject matter in Bull. North Carolina Dept. Agric. 40^3: 7–38. *10 fig.* 1919.—*F. A. Wolf.*

1237. Letteer, C. R. **The work of the San Antonio experiment farm in 1918.** U. S. Dept. Agric. Dept. Circ. 73. *38 p., 4 fig.* 1920.—Effect of rotation and tillage on cotton root rot.—See Bot. Absts. 6, Entry 1423.

1238. Macrum, C. A. **Combined bordeaux oil emulsion spray.** Better Fruit 14^8: 9, 39. 1920.—Directions are given for making a combination spray solution by the addition to each 200 gallons of 1.5 per cent Bordeaux mixture (6–6–50) of 1½ pounds glue and 12 gallons oil emulsion.—*A. E. Murneek.*

1239. Maheux, Georges. **Spraying to increase potato production.** Ann. Rept. Quebec Soc. Protection of Plants 12: 43–46. 1920.—Results of potato spraying on sixty experimental plots in forty countries are given. The yield for 1919 was 50 per cent higher in plots sprayed four times than the check plot, and the net profit $30.00 per acre more.—*B. T. Dickson.*

1240. Martin, W. H. **The relation of sulfur to soil acidity and to the control of potato scab.** Soil Sci. 9: 393–409. 1920.—In the experiments reported, five types of soil and two varieties of potatoes were used. It was found that when sulphur was added to the soils the decrease in scab corresponded to the increase of soil acidity as measured by the hydrogen-ion concentration. The increase in acidity depended not only upon the amount of sulphur added, but upon the percentage of sulphur which was oxidized. Where the hydrogen-ion concentration of water extracts of the soil was P_H 5.8 or less before sulphur was applied, 300 to 500 pounds per acre gave approximately as good control as heavier applications. Where the initial hydrogen-ion concentration exceeded 6.0 heavier applications (600–1200 pounds) gave best control.—*Dorothy Wilson.*

1241. McCubbin, W. A. **The seed potato question.** Seed World 8^5: 24–25. 1920.

1242. Newell, W. **Citrus canker eradication in Florida.** Monthly Bull. California State Commission Hort. 8: 394–395. 1919.—The rapid spread of the citrus canker disease, in Florida after 1912, when it was first observed by Dr. E. W. Berger is noted. Through the aid of the state appropriations, however, work was conducted from 1912 to 1919 which practically eradicated all signs of the disease.—*E. L. Overholser.*

1243. Nowell, W. **Red ring disease of coco-nuts.** Agric. News [Barbados] 19: 222. 1920.—A method for the disposal of nematode-infested material is given. It consists in digging up the palm by the roots and sawing the trunk into 3-foot lengths over the pit formed by the digging. Each length is then split longitudinally into about 6 pieces, and the whole lot of material, including leaves, sawdust, etc., is placed in the pit over some brushwood in the manner in which it is usual to place material for burning charcoal. The heap is then set on fire and left to burn slowly under a covering of earth until all has been burnt to ashes. The method is somewhat expensive, but the results obtained justify its employment.—*J. S. Dash.*

1244. Pethybridge, F. R. **Potato spraying trials in the Cambridge Fens, 1919.** Jour. Ministry Agric. Great Britain 27: 282–286. 1920.—Results are given from some potato-spraying trials conducted during 1919 in which 1 and 2 per cent Bordeaux and Burgundy mixtures were used at the rates of 85 and 200 gallons per acre. In all cases some scorching of the foliage was obtained, and in a few cases it was severe. The weather was hot and dry during a part of the season, and this was said to be the cause of the scorching. The yields were less in the sprayed than in the unsprayed plots.—*M. B. McKay.*

1245. Pipal, F. J. **The barberry and its relation to the stem rust of wheat in Indiana.** Proc. Indiana Acad. Sci. **1918**: 63–70. *2 fig.* 1920.—The author discusses briefly the history of *Berberis vulgaris* in its relation to wheat rust and cities 13 specific cases of rust outbreak investigated during the summer of 1917.—*F. C. Anderson.*

1246. Regan, W. S. **The destruction of Ribes by chemical means.** American Plant Pest Committee Bull. 4: 12. 1920.—Dip oil, containing 25 per cent cresol, sprayed on tops or crown of bushy species kills in the majority of cases. Dilutions of dip oil with fuel oil, 36.3 degrees Beaumé, at the rate of 1 to 5 and 1 to 8 is advised for areas of skunk currant (*Ribes*

cynosbati), two or three applications being necessary to kill. Spraying the foliage kills in from a half hour to a few hours. Efficiency of dip oil is little effected by rain, sunlight, absence of foliage, or season. Fuel oil alone is effective if two or three applications are made. Neither oil is poisonous to animals. Treatment is economical where pulling is difficult. Compressed-air hand sprayers were used.—*W. H. Rankin.*

1247. Robertson, W. H. **Commercial and home-made lime-sulphur spray.** Agric. Jour. [British Columbia] 4: 375. 1919.

1248. Rodda, T. E. **Control of brown rot on peaches.** New Zealand Jour. Agric. 20: 20–23. 1920.—Brown rot did not develop to any extent on account of the dry season. Fruit was treated to prevent development of brown rot after picking. Dipping in bluestone 1–10 or 1–20 caused fruit injury, while 1–40 was apparently safe. Formalin solution 1–50 produced spots on the fruit, while 1–100 did not injure it. Lime-sulphur solution 1–15 and 1–30 did not affect fruit, but the 1–15 left too heavy a deposit on the peaches. Permanganate of potash 1–640 did not injure fruit. Applications of Bordeaux powder, sulphur dust, and a lime-sulphur dust were unsatisfactory. Fumigation with sulphur (¼ oz. per 100 cu. ft.) and with formalin (½ oz. per 100 cu. ft.) injured the fruit.—*N. J. Giddings.*

1249. Schaffnit, E. **Versuche zur Bekämpfung des Kartoffelkrebses im Jahr 1918/19. [Control experiments against Potato Canker (Black wart.]** Zeitschr. Pflanzenkrankh. 30: 59–67. 1920.—Author states that soil disinfection experiments gave no practical results. He then discusses the results of experiments relative to resistance of potato varieties to *Chrysophlyctis endobiotica.* Of the varieties tested for five years the following proved immune: (1) Early: Sechswochen (verbesserte lange), Poppehurt; (2) Medium Early: Koralle, Lech; (3) Medium Late: Danusia, Jubel, Ada; (4) Late: Agraria, Erika. A number of the varieties tested for a period of four years also remained without attack.—It is important to note that some varieties proved immune for one year or several years, but were slightly attacked in other years. This observation is explained as due to the use of "deteriorated" seed. Author suggests that the immunity of the varieties mentioned is not absolute, but only relative; that varieties showing immunity under normal conditions may lose this faculty as soon as the plant no longer exhibits its normal form of development and is weakened in its physiological functions, as a result of pathological conditions transmissible through the seed tuber. The contrasting results given by author in support of his argument seem to substantiate his findings. Hence there exists in these varieties and in their behaviour towards the causal agent of potato canker a classical example of immunity and "predisposition" (in Sorauer's sense) of plants according to their constitution in their relation to a pronounced parasite. The use of varieties of proven immunity on infected lands is recommended under proper legislative safeguards.—*H. T. Güssow.*

1250. Schoene, W. J. **Twelfth report of the State Entomologist and Plant Pathologist 1918–1919.** Quart. Bull. Virginia Crop Pest Commission 1^4: 1–28. 1920.—Contains brief notes on the following topics: Inspection for pine blister rust; cedar rust and cedar eradication; "Take-all" disease of wheat in Virginia.—*F. D. Fromme.*

1251. Selby, A. D., and R. C. Thomas. **Bordeaux mixture an active fungicide.** Monthly Bull. Ohio Agric. Exp. Sta. 5: 220. July, 1920.

1252. Shapovalov, Michael. **The potato-scab control problem as it stands to-day.** Potato Mag. 2^{11}: 8–9, 26. *3 fig.* 1920.

1253. Tice, C. **Certified potato seed production.** Agric. Jour. [British Columbia] 5: 197. 1920.—See Bot. Absts. 7, Entry 665.

1254. Vayssiere, P. [Rev. of: Vermorel (V) and Dantony (E.) **Composition chimique des Bouillies sulfo-calciques employees contre les Insectes et les Maladies des plantes.** *20 p.* Montpellier et Villefranche, 1919. **(Chemical composition of lime sulphur used in combating insects and diseases of plants.)**] Bull. Soc. Path. Veg. France 7: 86. 1920—*C. L. Shear.*

1255. Westerdijk, Johanna. **Das Spritzen der Kartoffeln in den Niederlanden. [Spraying potatoes in Holland.]** Jahresb. Verein. Angew. Bot. **16**: 132–138. 1918.—Spraying for potato blight (*Phytophthora*) is much commoner in Holland than in Germany. It is particularly necessary in the provinces near the sea. Two treatments beginning late in June are important. A third treatment often is necessary. In Friesland six treatments may be made, depending on conditions. Bordeux or Bungundy mixture is used of 1.5 per cent strength and is applied at the rate of 750 to 1000 liters per hectare. Increased yield from spraying is sufficient to pay the cost of application.—Brief discussion is given of resistant varieties.—*D. Reddick.*

REGULATORY MEASURES

1256. Federal Horticultural Board, U. S. Dept. Agric. **[Restrictive legislation and notices of quarantines in U. S. A.]** Service and Regulatory Announcements 68: 52–111. 1920. —Correspondence relating to legislation in state of Texas with respect to pink bollworm of cotton shows some of the difficulties involved in enacting effective eradication provisions, especially when "states rights" are involved. The Texas and the Louisiana pink bollworm acts of 1920 are reproduced in full.—Notice of domestic federal quarantine 45 on account of gypsy moth and brown tail moth, with regulations. An extension of the area in which there are restrictions upon the movement of all forest and quarry products.—Notice of domestic federal quarantine 46 on account of pink bollworm of cotton with rules and regulations. This notice is also issued as an unnumbered leaflet by the U. S. Secretary of Agriculture.—Notice of quarantine 47 against Hawaiian and Porto Rican cotton, cotton seed and cotton products, with regulations. Previous quarantine restrictions are simply brought into one document.—List of current quarantine and other restrictive orders.—*D. Reddick.*

1257. Friedrichs, K. **Zur Organisation des Koloniales Pflanzenschutzes. [Organization of plant protection for the colonies.]** Tropenflanzer **21**: 311–322. 1918.

1258. Lyne, W. H. **Horticultural quarantine in B. C.** Agric. Jour. [British Columbia] **4**: 132–133. 1919.—See Bot. Absts. 7, Entry 983.

1259. Schoene, W. J. **Partial report of inspection work during autumn of 1919 and spring of 1920.** Quart. Bull. 2^2: Virginia Crop Pest Commission. *4 p.* 1920.—Of a total of 157,030 apple trees inspected during the period covered by the report slightly more than five per cent were discarded on account of crown-gall. The percentage of defective trees from various nurseries ranged from zero to as high as forty per cent. The details of the inspection are shown in tabular form, with the nurseries from which the shipments originated grouped by states. The apple stock which was grown in Virginia nurseries averaged 2.14 per cent affected with crown-gall, while that which originated without the state averaged 5.55 per cent. —*F. D. Fromme.*

MISCELLANEOUS (METHODS, COGNATE RESEARCHES, ETC.)

1260. Anonymous. **Exhibition of diseases of the para rubber tree.** Nature **105**: 86–87. 1920.—An exhibit of fungous diseases of *Hevea brasiliensis* in Ceylon and Malaya prepared by J. B. Farmer and opened March 10, at the Imperial Coll. Sci. and Tech. Several diseases are of great importance to the rubber industry. Principal diseases in exhibit: (1) Brown Bast, most important so far, perhaps of bacterial origin: (2) *Fomes lignosus* on roots, second in importance; (3) *Fomes pseudoferreus*, also on roots; (4) Dry Rot (*Ustulina zonata*), a wound parasite; (5) Patch Canker (*Phytophthora faberi*) a bark disease which is increasing; (6) Stripe Canker (*Phytophthora* sp.), affected 70 per cent of trees on some estates in 1915–17; (7) Pink Disease (*Corticium salmonicolor*).—*O. A. Stevens.*

1261. Anonymous. **An Imperial Bureau of Mycology.** Agric. News [Barbados] **19**: 30. 1920.—Reviews the report of the proceedings of the second meeting of mycological workers of India, at which a resolution was passed favouring the establishment of an Imperial Bureau

of Mycology to work along similar lines to the already existing Imperial Bureau of Entomology, for the identification of fungi, the publication of pathological literature, the establishment of a plant-pathology library, and the answering of enquiries of plant pathologists.—*J. S. Dash.*

1262. Bokura, Umenojo. **A new bacterial disease of gypsy-moth caterpillars.** Ann. Phytopath. Soc. Japan 1[3]: 34–55. 1920.—[Following abstract is from English résumé, p. 55.] As a natural enemy of the gypsy-moth caterpillar (*Lymanthria Dispar* L.) this disease which is wide-spread in Japan is, together with a parasitic species of Hemiptera, playing a most important rôle in checking the spread of the insect. Appearing when the worm has reached its fourth or fifth moulting skin, the disease, "Nankwabyo," resembles the "Nankwabyo," a kind of "flacherie" of silk worms. It is caused by a new species of bacteria, *Bacillus Disparis* Hori and Bokura. The pathogene is rod-shaped, measures 1–1.3 × 0.7–0.8 microns, with 6 to 8 peritrichiate flagella. Endospores are not formed, and it is not discolored by the Gram's method. Konjak-medium is not liquefied. Fermentation is readily set up in dextrose, laevulose, saccharose, maltose, and galactose. Optimum temperature is 30°–32°C. When fed to gypsy-moth caterpillars death ensues in from 1 to 8 days. It is non-pathogenic to silkworms, *Anomala rufocuprea* Motsch., *Pieris rapae* L., *Aphis* sp. on lily and *Hemerophila atrilineata* Butl. on mulberry. It is recommended that sterilized water in which the bouillon or soy-bean cake decoction culture of the bacteria is mixed be sprayed on plants on which the worms are feeding, or else the body-fluid of the diseased caterpillars be used as spray material.—*L. M. Massey.*

1263. Dickson, B. T. **Report of the delegates to the Canadian Branch of the American Phytopathological Society.** Ann. Rept. Quebec Soc. Protection of Plants 12: 24–27. 1920.—An account of the annual meeting held on December 11 and 12, 1919, at the Ontario Agric. Coll. A short summary of each address and paper is given.—*B. T. Dickson.*

1264. Hort, Edward C. **The cultivation of aerobic bacteria from single cells.** Jour. Hygiene **18**: 361–368. *1 fig.* 1920.

1265. Hoxie, Frederick J. **Roof construction for factories with excessive moisture.** Amer. Architect **115**: 181–187. *20 fig.* Jan. 29, 1919.—Rotting of roof planks and sweating can be prevented in a large part by improved design and construction. Chamfering off upper corners of wide beams would prevent the usual rotting off of roof planks above the beams. Ornamental moldings at the upper edges of the beams, and sheathing should be avoided. Insulation upon the outside of a roof should prevent precipitation of water within the plank. Such an insulated roof would consist of an outer creosoted plank and an inner untreated plank separated by waterproofed material. Insulation added to old roofs which have begun to decay should retard the destruction. Other means of assistance in preventing the rot in roofs are: insulation of skylights, drains, and ventilators to prevent radiation of heat; the proper placing of heating pipes to keep the roof dry and warm, and prevent circulation of moist air against cool roofs.—*Walter H. Snell.*

1266. Hudig, J., and C. Meyer. **De Hooghalensche ziekte een nieuwe bodemziekte on zand—en veengronden. [The Hooghalen disease, a new soil disease on sand and peat soils.]** *25 p.* Den Haag: J. en H. van Langenhuysen, 1918.

1267. Jones, L. R., M. Miller, and E. Bailey. **Frost necrosis of potato tubers.** Wisconsin Agric. Exp. Sta. Res. Bull. 46. *46 p., 1 colored pl., 12 fig.* 1919.—Potatoes slightly frosted may be internally discolored when seemingly unaffected externally. Such injuries are termed "frost necrosis" and should be differentiated from other necrotic lesions, especially the non-parasitic but inheritable "net necrosis" and the parasitic types of "ring necrosis." The symptoms, which are described and figured in detail, include blotching and netted or ring discolorations of the interior tissues, and are more pronounced at the stem end than eye end of the tuber and in the vascular elements more than in the parenchyma. Experimental

chilling included trials in accurately controlled freezing chambers where the temperature could be dropped at any desired rate. There is variation in individual susceptibility of tubers; in general, frost necrosis appears following exposure to about −10°C. for 1 hour, −5° for 2 hours, or to slightly below −3° for several hours. While the actual freezing temperature is near 1°C., super-cooling to −3° to −5° is necessary, the degree of this being greater with slow rate of temperature drop. The conditions of turning sweet and of freezing solid are also described. Neither variety, size, maturity, nor relative tuber turgidity seems to influence frost necrosis. Sprouts are relatively resistant, but start slowly. Therefore, it is not advisable to use frosted potatoes for seed. Frost necrosis symptoms are not inherited. —*R. E. Vaughn.*

1268. Lee, S. C. **Electrical treatment of seed.** Agric. Gaz. Canada **7**: 248–249. 1920.—See Bot. Absts. 7, Entry 625.

1269. Manaresi, Angelo. **Sui danni prodotti ai fiori degli alberi fruttiferi dalle gelate primaverili in genere e da quelle in particolare dei giorni 28, 29, e 30 marzo 1918. [Damage to flowers of fruit trees by spring frosts and in particular the frosts of March 28, 29, and 30, 1918.]** Rev. Patol. Veg. **10**: 1–26. 1919.—See Bot. Absts. 7, Entry 986.

1270. Moore, V. A. **Principles of Microbiology.** *8vo. 506 p.* New York, 1918.—A treatise on bacteria, fungi, and protozoa pathogenic to domesticated animals.

1271. Neger, F. W. **Die Rolle des Lichtes und Chlorophylls bei der Entstehung von Rauchschäden an grünen Pflanzen. [The rôle of light and of chlorophyll in the initiation of smoke injury to green plants.]** Zeitschr. Forst-u. Jagdw. **48**: 624–635. 1918.—Abst. in Zentbl. gesamte Landw. 1, Entry 445.

1272. Rayner, M. C. **Mycorrhiza and the Ericaceae.** [Abstract.] Rept. British Assoc. Adv. Sci. **1919**: 332. 1920.

1273. Smith, Erwin F. **An introduction to bacterial diseases of plants.** *23 × 15 cm., XXX + 688 p. 453 fig. and frontispiece.* W. B. Saunders Co.: Philadelphia, 1920.—"Manuscipt of this book was completed for publication in 1915 and, in general, that year may be taken as the date of the outlook, but here and there, where it seemed most necessary, it has been revised down to the end of 1919."—The book has been made primarily for laboratory use under the guidance of a competent teacher. It is the "result of 35 years of reading and 25 years of diligent laboratory and field investigation."—Part 1 (75 p.) is a conspectus of bacterial diseases of plants under the topics: distribution, period of susceptibility, infection incubation, recovery from disease, transmission of pathogene, morphology and physiology, of parasite, action of parasite on host, host reaction, methods of control. Part 2 (56 p.) deals with technique: apparatus, culture media, isolation, inoculation, sectioning, staining, illustrating, cataloging, etc. Part 3 (341 p.) is devoted to an extended account of the diseases caused by the following organisms: *Bacillus tracheiphilus, Bact. campestre, Aplanobacter stewarti, Bact. solanacearum, Aplanobacter michiganense, Bacillus carotovorus, B. phytophthorus, Bact. phaseoli, Bact. maculicolum, Bact. malvacearum, Bact. mori, Bacillus amylovorus, Bact. savastanoi,* and *Bact. tumefaciens.* Part 4 (160 p.) deals with tumors, tumor formation, experimental teratoses. Part 5 (30 p.) contains suggestions for students about study, experimentation, interpretation, presentation, ethics, etc.—*D. Reddick.*

1274. Wieler, A. **Rauchschaden bei Kokereien. [Smoke injury from coke ovens.]** Jahresb. Vereinig. Angew. Bot. **16**: 64–76. 1918.—Abstract in Zeitschr. Pflanzenkr. **30**: 22–23. 1920.

1275. Zavitz, C. A. **Systematic experiments.** Agric. Gaz. Canada **7**: 244–246. 1920.—See Bot. Absts. 7, Entry 684.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Heber W. Youngken, *Editor*
E. N. Gathercoal, *Assistant Editor*

1276. Angerhausen, J. **Oxalsäure in Rhabarber und die Entgiftung von Rhabarberzubereitungen.** [**Oxalic acid and the detoxification of rhuharb products.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 81–87. 1920.—In rhubarb malic, citric and oxalic acids occur. The latter occurs in water soluble form in the leaves about twice as abundantly as in the stalk. Compotes, marmalades, etc. to which the rhubarb leaves were added have produced poisoning, especially in children. In adults 0.6 grams of free oxalic acid is said to suffice to deprive the blood of its protecting calcium. 200 grams of rhubarb leaves may contain 1.0 gram oxalic acid. In preparing rhubarb leaves one should add to the water 0.5–1 gram of calcium carbonate for every 100 grams rhubarb. Toxic effects are thus prevented.—*H. G. Barbour.*

1277. Angerhausen, J. **Über Saft aus Rhabarberstielen.** [**Juice from rhubarb stalks.**] Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 122–130. 1920.—A detailed chemical analysis. To de-acidify rhubarb juice, the addition of 0.25–0.35 per cent calcium carbonate is suggested which also detoxifies by removal of oxalic acid. As a preservative, 10 per cent alcohol or 0.25 per cent formic acid is suggested.—*H. G. Barbour.*

1278. Atkinson, E. H. **Weeds and their identification.** New Zealand Jour. Agric. **20**: 299–301. *Pl. 1.* 1920.—See Bot. Absts. 7, Entry 12.

1279. Bailey, E. M. **Food products and drugs.** 1919. *Part* 1. Connecticut [New Haven] Agric Exp. Sta. Bull. **219**: 209–259. 1919.—The work comprises the results of food and drug inspection for 1919, as required by State statute.—*Henry Dorsey.*

1280. Cockayne, L. **An economic investigation of the montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. **20**: 337–345. *Fig. 1–7.* 1920.—See Bot. Absts. 7, Entries 600, 601.

1281. Goris, A., and Ch. Vischniac. **Caractères et composition du Priméverose.** [**Characteristics and composition of "primeverose."**] Compt. Rend. Acad. Sci. Paris **169**: 871–873. 1919.—See Bot. Absts. 7, Entry 1311.

1282. Greig-Smith, R. **The germicidal activity of the Eucalyptus oils. Part 2. The action of the oils in aqueous dilutions.** Proc. Linn. Soc. New South Wales **44**: 311–347. *Text-figs. 1–7. Tables 1–21.* 1919. (See Bot. Absts. 5. Entry 801.) Eucalyptus oils are irregular in their action upon *B. coli communis.* Cineol begins to act in about one minute and a half; phenol, used as a standard of comparison, acts instantly. The curves of cineol and phenol cross in five minutes with a dilution of 1:75 at 20°. The phenol-coefficient of cineol in 15 minutes at 20° is 3.1, in 30 minutes 3.4; in 4 hours it declines to 2.8. Aromandendral is the most active of the constituents of the oils, with a phenol-coefficient of 21.1 in 30 minutes. Piperitone is the next most active. Pinene and sesquiterpene are low (0.8 to 0.5). The rectified oils of *E. cinerea* and *E. Smithii* are more efficient than the crude oils; in the case of the former this appeared to be due to the hydrolysis of the esters and subsequent oxidation of alcohols to aldehydes. Treatment with alkali did not reduce the efficiency of the acid rectified oils. Addition of acetic acid to crude oil doubled its germicidal powers in the course of 3½ months. (The addition of acid also increases germicidal activities in the case of phenol.) This activity is proportional in the oils of *E. cinera* to the starch-iodide reaction and not to acidity, but this is not true for the oils as a class. The rectified oil of *E. polybractea* is less efficient than the crude oil. The oil of the Braidwood variety of *E. Australiana,* which grows on high ridges is the best and cheapest disinfecting oil (phenol-coefficient 5.8 in 30 minutes), the second best crude oil tested was that from *E. cneorifolia* (4.8 to 30 minutes).—*Eloise Gerry.*

1283 Griebel, C. **Die mikroskopische Untersuchung der Tee-und Tabakersatzstoffe. [Microscopy of tea and tobacco substitutes.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 225–299. 9120.—The author describes 67 substitutes.—*H. G. Barbour.*

1284. Griebel, C. **Zur Anatomie der Lupinensamen. [Lupine seeds.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel **39**: 297–299. 1920.

1285. Mitchell, D. T. **Poisoning of cattle by feeding on ergotized Paspalum.** Jour. Dept. Agric. Union of South Africa **1**: 422–426. 1920.—The cultivation of Paspalum on an extensive scale in Natal is of comparatively recent date, and in recent years it has been noted that in cattle which were allowed access to the Paspalum lands at a certain season, symptoms of incoordination of movement appeared. A large percentage of the Paspalum heads were found to be infected with *Claviceps Paspali.* From a series of experiments carried out at the Veterinary Research Laboratory it was noted that the initial symptoms appeared in each case on the second day after the infected heads were fed to the animals, and were characterized by muscular tremors, hypersensitiveness, increased glandular secretion and increases in respirations and pulse rate. These symptoms were rapidly followed by incoordination of movement, lack of tone of the leg muscles, loss of appetite and constipation. Recovery was noted to commence about the fifth or sixth day. Prophylactic measures consist of reaping and collection of the grass during the flowering season.—*E. M. Doidge.*

1286. Smith, H. G. **On the essential oil of Boronia pinnata Sm. and the presence of Elemicin.** Proc. Roy. Soc. Victoria **32** (N. S.): 14–19. 1919.—The Boronias (*Rutaceae*), abundant in Australia, have flowers which are often strongly perfumed. The essential oil was distilled from *Boronia pinata* plants in full bloom. It was found that the principal constituent (about three-fourths or 70 per cent of the oil) is the trimethoxyphenol-ether, elemicin. This substance also occurs in the oil of Manila Elemi distilled from *Canarium commune* L. (*Burseraceae*), but this is the first time that elemicin has been detected in the oil of Australian plants. The odor of the crude oil suggests geraniol. Details of the distillation and analysis are given.—*Eloise Gerry.*

1287. Smith, E. Philip. **Plant Dermatitis II.** Jour. Botany **58**: 173–176. 1920.—The symptoms and treatment of lacquer poisoning are given. It is noted that this type of poisoning is not common in England, but is very frequent in Japan and China where the lacquer industry is considerable. Lacquer is made from the juice of *Rhus vernicifera.* Confectioners often suffer from vanilla dermatitis, which is probably due to oil of Cashew. The dust from certain fine woods often irritates the skin or mucus membrane of workers in these woods, as satinwood, teak, ebony, rosewood, olive-wood, box, coco-wood, and partridge-wood. The poisonous substances are apparently normal products of metabolism in the plant, and are only by accident discovered to be poisonous. The biological significance of the poison must be worked out with care to avoid hasty inferences. From the point of view of human contact there are two types of substances: one soluble in water (e.g. nettle), the other of oily nature (Rhus). Specially sensitive skin may be affected by almost any combination of rough hairs with exuded cell-sap. Personal idiosyncrasy plays a very important part in dermatitis. A list is given of forty-two plants known to cause dermatitis, and a bibliography of the subject is appended.—*K. M. Wiegand.*

1288. Simpson, José Agustin. **Estudio sobre el ácido cianhidrico en el "Phaseolus lunatus" (Frijol de Birmania). Discurso de recepción como académico de número. [Study on hydrocyanic acid in Phaseolus lunatus (Birmania bean). Address delivered on becoming a member of the academy.]** An. Acad. Cien. Habana—Rev. Cien. **60**: 250–283. *10 fig.* 1919. —A number of varieties of beans of the species *Phaseolus lunatus* which are imported into Cuba in considerable quantities were studied. These are known commercially as Java, Birmania, Rangoon, Lima, or Burma beans. Considerable variety in color pattern is shown; one of the most poisonous varieties is described as of a rather pale yellowish color, mottled with gray or lilac spots or bands, elongated parallel to the dorsal portion of the seed.—The

poisonous principle of the beans is due to the glucoside "Phaseolunatina," $C_{10}H_{17}O_6N$, which by hydrolysis forms among other products hydrocyanic acid. This highly toxic principle occurs in enormous quantities in uncultivated varieties of *Phaseolus lunatus*, the amount varying from 65 to 320 milligrams in 100 grams of beans. In cultivated, improved varieties the poison is produced in hardly appreciable amounts. Histological studies were made of these beans and it was found that they could be readily distinguished from ordinary beans (*Phaseolus vulgaris*) by the form of certain cells of the seed coat and the absence in these of crystals of oxalate of lime.—Prolonged boiling never completely removes the poison but as boiling water dissolves the "Phaseolunatina" without destroying it, the decoction is as dangerous as are the beans themselves. It is only by means of delicate chemical tests that it is possible to positively distinguish the poisonous from the improved varieties. The glucoside in question is acted upon by various elements; among these the enzymes contained in the beans in the presence of moisture, so that if the cells containing the glucoside are broken and this comes in contact with the ferments, the reaction resulting in the formation of hydrocyanic acid takes place. The hydrolysis is much more active if water is then added, resulting in a much more rapid formation of the poison. This fact is taken advantage of in determining the amount of hydrocyanic acid contained in the beans. A rapid method of quantitative analysis is described in detail. The hydrocyanic acid in the distillate is determined by the gravimetric, volumetric, or colorimetric method, the volumetric method of Liebig being especially rapid. Another method of determining the poison contained in these beans is described, this being based on the transformation of hydrocyanic acid into sulpho-cyanic acid. By this process it is possible to determine quantities as small as 0.00001 HCN. Among the varieties of beans studied only one, the "White Rangoon" was found to produce more than 40 milligrams of hydrocyanic acid in 100 grams of the product. Other types of Rangoon and Burma beans produced only 3 to 8 milligrams of the poison. In addition to these beans, a large number of other varieties were analyzed, negative results being obtained in all, including the Lima bean in which no traces whatever of the poison were found. More than 80 analyses were made. The remainder of the paper deals with consideration of legislation relating to the sale for food purposes of the poison producing varieties of this bean. In France beans containing 20 grams HCN are considered fit for food. The author recommends that the amount of poison admissible should be less than that of the French legislation. —*S. C. Bruner.*

1289. Wattiez, N. **Contribution à l'étude Polygonum Bistorta (L.) Localisation du tanin. Son emploi conne succédané du Krameria Triandra (Ruiz et Pavon).** (**Contribution to the study of Pelugonum Bistorta. Localization of tannin. Its employment as a substitute for Krameria triandra.**) Ann. & Bull. Soc. Roy. Sci. Med. & Nat. Bruxelles. 4: 121–128. 1920.—In Belgium, during the war, the use of Cod Liver Oil being prohibited as a food and tonic, the iodo-tannic syrup was prescribed frequently. The want of Rhatany necessitated the search for an indigenous substitute. This has been found in the rhizome of Polygonum Bistorta which contains 15 to 18 per cent of tannin.—*Henri Micheels.*

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Associate Editor*

PROTOPLASM, MOTILITY

1290. Herlant, M. **Le cycle de la vie cellulaire. Recherches physiologique sur la division de la cellule. (Note preliminaire.)** [**The life cycle of the cell. Physiological investigations on cell division.**] Ann. et Bull. Soc. Roy. Sci. Med. et Nat. Bruxelles 4:112-117. 1920.—See Bot. Absts. 7, Entry 731.

1291. MacDougal, D. T., and H. A. Spoehr. **The components and colloidal behavior of plant protoplasm.** Proc. Amer. Phil. Soc. **59**: 150–170. 1920.—The authors give summarized statements of investigations on biocolloids previously published. Newly obtained results are given for (1) the proportions of carbohydrate and albuminous matter in a colloid of the highest hydration capacity; (2) the substances or ions of biological significance which would raise the hydration capacity of these phytocolloids to the highest limit; (3) measurement of the relative effects of some metallic bases upon a carbohydrate colloid; and (4) determination of the amplitude and continuance of alternating or repeated effects of renewed or replaced solutions. The highest swelling of pentosan-protein mixtures is that of agar 1, gelatine 3, in hundredth normal acid; such colloids are, however, unusual in the plant. Colloids in which the carbohydrate and albuminous components each vary in forming 30–60 per cent of the total and showing high hydration capacities in the hydroxides, in glycocoll and in water, furnish an analogue of living matter of proved similarity of composition and action. Biocolloids containing more carbohydrate than albuminous matter would be most sensitive to the presence of hydrogen ions, and their growth would be markedly limited by acidity. All types of biocolloid would respond by increased hydration to the presence of amino acids, as shown by relative swellings in glycocoll and in histidine. Mixtures consisting of 40–60 per cent of the two main components are seen to give the highest swelling values in histidine yet obtained for biocolloids by treatment with any reagent. Alkaline hydroxides may cause a swelling of agar greater than in water, as in the case of experiments with amino acids. The stronger the base as indicated by its position in the electromotive series, the more it restricts hydration. The inclusion of a substance or ion in a colloidal structure results in hydration relations of a different character from those which appear when the substance in question is presented in the hydrating solution. Unequal expansion in all directions of dried sections of colloids when immersed in solutions was again observed.—*Wanda Weniger.*

DIFFUSION, PERMEABILITY, ADSORPTION

1292. André, G. **Sur l'exosmose des principes acides et sucrés de l'orange. [Exosmosis of the acids and sugars of the orange.]** Compt. Rend. Acad. Sci. Paris **170**: 1199–1203. 1920. —A comparison is made of the rate of diffusion of acids and sugars through the cells of intact quarters of oranges immersed in distilled water and in sugar or salt solutions respectively. Sugar and acid are found to leave the cells in about equal proportions, the ratio of sucrose to reducing sugars remaining approximately constant, though a considerable inversion of sucrose occurs during exosmosis.—*C. H. Farr.*

1293. Bradford, S. C. **Adsorptive stratification in gels.** Biochem. Jour. **14**: 29–41. *Pl. 2.* 1920.

1294. Bradford, Samuel Clement. **Adsorptive stratification of gels. IV.** Biochem. Jour. **14**: 474–482. *Pl. 7–8, 1 fig.* 1920.

1295. Lloyd, Dorothy Jordan. **On the swelling of gelatin in hydrochloric acid and caustic soda.** Biochem. Jour. **14**: 147–170. *7 fig.* 1920.

1296. Stiles, Walter. **I. The penetration of sodium chloride into gels of agar-agar, containing silver nitrate.** Biochem. Jour. **14**: 58–72. *4 fig.* 1920.—Agar containing silver nitrate is employed as the gel, and the progressive penetration of sodium chloride is observed by the precipitation of silver chloride. Such penetration is found, within wide limits, to be proportional to the square root of the time and is a constant for any particular gel and any particular concentration of penetrating salt. The rate of penetration depends upon (1) the initial concentration of the penetrating salt, and (2) the concentration of silver nitrate. The concentration of the gel has little influence. An empirical relation is found between penetration, time, and penetrating salt.—*Alva R. Davis.*

WATER RELATIONS

1297. Rivett, Maud F. **The anatomy of Rhododendron ponticum, L., and of Ilex aquifolium, L., in reference to specific conductivity.** Ann. Bot. 34: 525–550. 1920.—The series of studies on the anatomy of woods in relation to water-conducting efficiency is here continued in connection with the evergreen holly and *Rhododendron*. Sections were cut at many places throughout the length of several different shoots and the following points determined: (1) total area of wood, (2) total area of cavities, (3) percentage of wood occupied by cavities, (4) average area of cavities, and (5) number of cavities per sq. mm. Curves are given to show the variation, with respect to each of these points, from base to tip of the shoots. The results obtained for these two species and for the ash and hazel in previous studies are compared. And the results in all four cases are correlated with those of experiments on water conductivity. All four agree in showing a general decrease in absolute conductivity from base to tip, and an increase in specific conductivity up to a certain point followed by a decrease. The difference in specific conductivity between the two evergreens is in agreement with the difference in percentage of wood occupied by cavities. This is also true in the case of the two deciduous forms. But the specific conductivity of the deciduous forms is higher than that of the evergreens, though the percentage of wood occupied by vessels is smaller. This difficulty is explained by reference to the greater length of the vessels in the deciduous species and the difference in the nature of their perforations.—*W. P. Thompson.*

1298. Steel, T. **On water from the roots of the red mallee (Eucalyptus oleosa).** Proc. Linn. Soc. New South Wales. 44: 348–352. 1919.—Water was obtained from the water-storing roots of *E. oleosa* by cutting lengths of roots and allowing them to drain. It was colorless, practically tasteless, and darkened with age and exposure to air. It contained 66.60 parts per 100,000 of total solids, 24.20 of which were salts and 42.40 organic matter, chiefly tannin. Soda (Na_2O) and chlorine were found to be high in relation to the other ingredients. Some mallee soil analyses also showed considerable concentration of these substances. It is thought that the root water may be a reserve supply held in special vessels and used during drought.—*Eloise Gerry.*

MINERAL NUTRIENTS

1299. Morita, Koichi, and Burton E. Livingston. **Some solution cultures of wheat without potassium.** Bot. Mag. Tokyo 34: 71–90. *1 fig.* 1920.—Nutrient solutions without potassium produced very satisfactory growth of wheat seedlings for three weeks. About 90 different three-salt solutions were used in which the total concentration of the salts corresponded to about one atmosphere of osmotic pressure. All of these solutions were without potassium, and of these the ones with the lower concentrations of the di-hydrogen phosphate produced the best plants.—*O. L. Sponsler.*

PHOTOSYNTHESIS

1300. Briggs, G. E. **Experimental researches on vegetable assimilation and respiration. XIII. The development of photosynthetic activity during germination.** Proc. Roy. Soc. London B, 91: 249–268. 1920.—Leaves were kept in an atmosphere of hydrogen, supplied with carbon dixoide, and the oxygen removed as fast as formed. This permits measurement of photosynthesis and maintenance of uniform amount of chlorophyll for considerable periods. Photosynthetic activity lags behind formation of chlorophyll, indicating some additional internal factor as the limiting one. This internal factor increases with age, so that with equal greenness in two leaves, a few days difference in age causes increased activity. Willstätter's failure to confirm the findings of Irving that young, fully green leaves might show no activity is due to the fact that he used leaves considerably older. A provisional conception of photosynthesis as consisting of diffusion, photochemical, and chemical stages is advanced as a means of analyzing limiting factors under various conditions.—*Paul B. Sears.*

1301. Fisher, Hugo. **Pflanzenwuchs und Kohlensäure. [Plant growth and carbonic acid.]** Naturwissenschaften **8**: 413–417. 1920.—The fact that CO_2 may be present in minimum quantity and thus be the limiting factor in plant growth is first pointed out. Then reference is made to the possibility that CO_2 present in the air may be increased by the CO_2 formed through the activity of the soil organisms. A review is given of his own and other experiments where the amount of CO_2 in the air is increased with resulting increase in growth as well as flower and fruit production. A practical application on a large scale is noted where the waste gases (containing about 5 per cent CO_2) produced in a certain steel mill were added to greenhouse and field cultures with favorable results.—*Orton L. Clark.*

METABOLISM (GENERAL)

1302. Anderson, R. J. **Occurrence of inosite hexaphosphoric acid in the seed of the silver maple (Acer saccharinum).** Jour. Biol. Chem. **43**: 469–475. 1920.—The principal organic phosphorus compound of maple seed is identical with the inosite hexaphosphoric acid which has been isolated from other plant material. Freshly powdered maple seed apparently do not contain any active phytase.—*G. B. Rigg.*

1303. Anonymous. **Coloring matters of plants.** Nature **105**: 139–140. 1920.—A popular summary regarding nature and distribution of such pigments.—*O. A. Stevens.*

1304. Bornemann. **Die organische Ernährung bei höheren grünen Pflanzen. [Organic nutrition of higher green plants.]** Naturwissenschaften **8**: 496–497. 1920.—This corrects a statement by Czapek in an article of the above title appearing in Heft 12, 1920, of this journal to the effect that the CO_2 from the soil does not have an influence on plant growth. The original quotation from Molliard is given, in which he states that CO_2 from soil organisms does have an appreciable effect on plant growth, which Czapek incorrectly translated.—*Orton L. Clark.*

1305. Bottomley, W. B. **The effect of organic matter on the growth of various water plants in culture solution.** Ann. Bot. **34**: 353–364. 1920.—To determine the necessity of organic matter for the growth of water plants in particular, and all plants in general, plants of *Lemna major* collected in May were grown in 150 cc. quantities of the following solutions: (1) Detmer's solution; (2) nucleic acid from raw peat, 1 gm. to 500 cc. water; (3) autoclaved *Azotobacter* 1 gm. to 1000 cc. water; and (4) water extract of bacterized peat, 1 gm. to 500 cc. water. One hundred freshly collected plants averaged 24.8 mg. in weight. After 3 weeks, (1) averaged 20.4 mg.; (2) 44.8 mg.; (3) 47.2 mg.; and (4) 46.5 mg. With (1) and (4) *Lemna major* collected in July, also *Salvinia natans*, *Azolla filiculoides*, and *Limnobium stoloniferum* showed similar results. The amount of organic substances in the medium was only 184 parts per million as compared to 5500 parts for nutrient salts; hence organic substances are not of nutrient value, but enable the plants to make full use of the nutrient salts. These results in conjunction with earlier ones indicate the necessity of a small quantity of organic substance for normal growth.—*F. S. Wolpert.*

1306. Carey, Cornelia Lee. **A method of preparation and some properties of a starch gel.** Bull. Torrey Bot. Club **47**: 455–463. 1920.—A starch gel was prepared by mixing 100 grams of commercial corn starch with 150 cc. of distilled water, pouring into Petri dishes, and treating in the autoclave for thirty minutes at from 105° to 110°C. When still warm the starch was cut into strips and dried. The properties of this gel, its adsorptive powers, and its microscopic structure are discussed.—*P. A. Munz.*

1307. Czapek, Friedrich. **Die organische Ernährung bei höheren grünen Pflanzen. [The organic nutrition of the higher green plants.]** Naturwissenschaften **8**: 226–231. 1920.—A review is given of data concerning various organic substances found in the soil and their absorption by the green plant. The carbon and nitrogen requirements of the higher plants, also the methods of culture used in testing the value of organic compounds, are described

and the difficulties pointed out. The taking up of colloidal substances by the roots is referred to. The author considers it still undecided as to whether or not the roots are able to secrete ferments acting on substances in the soil and rendering them available for absorption. Mycorhiza and the competition of various soil organisms are also briefly discussed. Important recent French and American results are not included.—*Orton L. Clark.*

1308. Ewart, A. J. **On the synthesis of sugars from formaldehyde, carbon dioxide and water.** Proc. Roy. Soc. Victoria N. S. **31**: 379–387. 1919.—The polymerization of formaldehyde to sugar by alkalies and alkaline carbonates was investigated. The main conditions for a high proportion of sugar were appropriate dilution and high temperature (100° to 110°C.). The byproducts were formates and methyl alcohol. The most rapid reaction was produced by sodium hydrate. In the presence of a neutral calcium salt, the amount of sugar condensation was greatly increased, less alkali was required, and less formate produced. Neutral barium and strontium salts were less effective as condensing catalytic agents. The sugar mixture is optically inactive, and contains reducing pentoses and reducing fermentable hexoses. Carbon dioxide and water are readily polymerized to sugar by the aid of magnesium.—*Eloise Gerry.*

1309. Freudenberg, K. **Über Gerbstoffe 4:** Peters, D. **Hamameli Tannin (II).** [**Concerning tannin 4:** Peters, D. **Hamameli tannin (II).**] Ber. Deutsch. Chem. Ges. **53**: 953–961. 1920.—Evidence is presented to show that the crystolloidal tannin obtained from *Hamamelis* contains a previously unknown sugar closely related to the hexoses.—*Henry Schmitz.*

1310. Friedmann, W. G. **The carbohydrates of the pecan.** Jour. Amer. Chem. Soc. **42**: 2286–2288. 1920.

1311. Goris, A., and Ch. Vischniac. **Caractères et composition du Priméverose.** [**Characteristics and composition of "primeverose."**] Compt. Rend. Acad. Sci. Paris **169**: 871–873. 1919.—Two glucosides isolated from *Primula officinalis* Jacq.—"Priméverine," and "primulaverine," respectively—on hydrolysis by a specific enzyme—"primeverase"—yield among other products a "biose" which the author calls "primeverose." The chemical and physical characteristics of this substance were studied at length. It was found to have among other properties the power to reduce Fehling's solution and when hydrolysis was effected by means of sulphuric acid the resulting mixture yielded osazones of glucose and xylose. The author concludes that "primeverose" is a biose built up from xylose and glucose.—*V. H. Young.*

1312. Judd, Hilda M. **The iodometric estimation of sugars.** Biochem. Jour. **14**: 255–262. 1920.—A modification of the iodometric sugar method of Colin and Lievin, and that of Willstätter and Schudel, is devised, the basis of which is the fact that a constant weight of iodine always reacts with a given weight of sugar, and that this weight of iodine is not affected by changes in the amount of alkali present, or by the presence of other sugars in the solution. The author makes special application of the method to the estimation of sugars in fruit juices. —*Alva R. Davis.*

1313. Kaulfersch, F. **Über die Bestimmung von in Zellmembranen eingeschlossener Stärke mit Hilfe von Kupferoxydammoniak.** [**Determination of the starch enclosed in cell membranes by means of copper ammonium oxide.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **39**: 344–346. 1920.

1314. Klason, P. **Über Lignin und Lignin Reaktionen.** [**Concerning lignin and ignin reactions.**] Ber. Deutsch. Chem. Ges. **53**: 706–711. 1920.—Experiments dealing with the chemical reactions of lignin indicate that the lignin molecule contains coniferyl aldehyde. The action of sodium sulphite on lignin is thus explained.—*Henry Schmitz.*

1315. LaForge, F. B. **Sedoheptose, a new sugar from Sedum spectabile. II.** Jour. Biol. Chem. **42**: 367–374. 1920.

1316. MacLean, Ida Smedley, and Ethel Mary Thomas. **The nature of yeast fat.** Biochem. Jour. **14**: 485–493. 1920.

1317. Miller, Elizabeth W. **The effect of cooking on the water-soluble vitamine in carrots and navy beans.** Jour. Biol. Chem. **44**: 159–173. 1920.—Cooking carrots for 30 minutes at 100°C. caused no reduction in the vitamine. Cooking navy beans at 120° for 30 minutes decreased the vitamine content 40.6 per cent.—*G. B. Rigg.*

1318. Mockeridge, Florence Annie. **The occurrence and nature of the plant growth promoting substances in various organic manurial composts.** Biochem. Jour. **14**: 432–450. 1920.—*Lemna major* was grown in Knop's solution to which were added small amounts of extracts from leaf mould, fresh and old manure, bacterized peat, etc. Cultures to which such extracts were added gave better growth than that of the control in Knop's solution alone. The author concludes that there are organic extractables in such materials, probably formed by bacterial action, which are beneficial to plant growth. A chemical study of such extracts showed all to contain nucleic acids and derivatives, and these are concluded to play an important rôle as auximones.—*Alva R. Davis.*

1319. Moore, Benjamin, and T. Arthur Webster. **Studies of photosynthesis in fresh-water algae.—1. The fixation of both carbon and nitrogen from the atmosphere to form organic tissue by the green plant cell. 2. Nutrition and growth produced by high gaseous dilutions of simple organic compounds, such as formaldehyde and methylic alcohol. 3. Nutrition and growth by means of high dilution of carbon dioxide and oxides of nitrogen without access to atmosphere.** Proc. Roy. Soc. London **B, 91**: 201–215. 1920.—The authors present reasons for thinking the earliest organisms could utilize both inorganic carbon and nitrogen, and that bacteria are later, specialized types. They indicate that the first synthetic agencies were inorganic colloids, utilizing shorter wave lengths of light. They also outline careful culture experiments showing that green algae, (a) if supplied with carbon dioxide, will grow and fix atmospheric nitrogen; (b) will exhibit fixation and growth much faster if supplied with nitrites or oxides of nitrogen in addition to carbon dioxide; and (c) can utilize extremely dilute solutions of formaldehyde and methylic alcohol as sole sources of carbon. Oxides of nitrogen are available in pure country air.—*Paul B. Sears.*

1320. Nierenstain. M. **Waage's phytochemical synthesis of phloroglucin from glucose.** Nature **105**: 391. 1920.—The author states that he has tried the experiment (floating leaves in sugar solutions exposed to sunlight) nearly eighty times in the last fifteen years without success.—*O. A. Stevens.*

1321. Pringsheim, H. **Über das Vorkommen optischer Antipoden in der Natur. [Concerning the occurrence of optical antipodes in nature.]** Ber. Deutsch. Chem. Ges. **53**: 1372–1374. 1920.—A critical discussion of the work of Hesz.—*Henry Schmitz.*

1322. Raistrick, Harold, and Anne Barbara Clark. **On the mechanism of oxalic acid formation by Aspergillus niger.** Biochem. Jour. **13**: 329–344. 1919.—*Aspergillus niger* was grown on synthetic media with Na, NH_4, or Ca salts of organic acids as sources of carbon, and the quantity of oxalic acid produced was estimated. The carbon sources behaved as follows in reference to growth and acid production: (1) Four-carbon dibasic acids gave good growth and good yield of oxalic acid; (2) four-carbon monobasic acids gave almost no yield and no oxalic acid; (3) three-carbon acids gave very good growth and either no yield or small yield of acid; (4) two-carbon acids, as acetic, gave good growth and yield of acid, while glycollic and glyoxalic acids gave but fair growth and no acid; (5) the one-carbon acid, formic, gave fair yield and no oxalic acid. A theoretical scheme is suggested to represent the breakdown of sugar to oxalic acid. This involves the intermediate formation of β-δ-di-keto-adipic acid which hydrolyses to acetic and oxalic, the acetic in each case oxidizing to oxalic.—*Alva R. Davis.*

1323. Rosenheim, Otto. **Note on the use of butyl alcohol as a solvent for anthocyanins.** Biochem. Jour. 14: 73–74. 1920.—The author finds butyl superior to amyl alcohol as a solvent for anthocyanin, the former removing all the anthocyanins, (mono- and rhamno-glucosides, as well as normal glucosides) while in the latter the first two groups of glucosides alone are soluble to any great extent. The method of extraction with this solvent is described.—*Alva R. Davis.*

1324. Rosenheim, Otto. **Observations on anthocyanins. I. The anthocyanins of the young leaves of the grape vine.** Biochem. Jour. 14: 178–188. *1 fig.* 1920.—The red pigment of the grape was isolated in crystalline form and found to be probably identical with oenidin, the non-glucosidic component of the purple grape. The occurrence of a colorless modification of the pigment was demonstrated, present in combination possibly with a carbohydrate or other complex and is converted into anthocyanidin by strong acids. The European species, *Vitis vinifera*, seems the only member of the genus to produce free anthocyanidin, and the bearing of this on genetic problems is discussed.—*Alva R. Davis.*

1325. Schoorl, N. **Zur Titration von Zuckerarten.** [Titration of sugars.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 39: 180–182. 1920.

1326. Simpson, José Agustin. **Estudio sobre al ácido cianhídrico en el Phaseolus lunatus (Frijol de Birmania). Discurso de recepción como académico de número.** [**Hydrocyanic acid in Phaseolus lunatus (Birmania bean). Address delivered on becoming a member of the Academy.**] An. Acad. Cien. Habana—Rev. Cien. 55: 250–283. *10 fig.* 1919.—See Bot. Absts. 7, Entry 1288.

1327. Venn, Elfrida C. V. **The influence of reaction on colour changes in tyrosine solutions.** Biochem. Jour. 14: 99–102. *1 fig.* 1920.—This study has to do with the effect of varying degrees of acidity and alkalinity upon colors produced by one strain of bacteria upon a single amino acid.—*Alva R. Davis.*

1328. Whipple, Bertha K. **Water-soluble B in cabbage and onion.** Jour. Biol. Chem. 44: 175–187. 1920.—Not more than one-half the water-soluble B is lost in the cooking water from cabbage or from onions boiled for 30 minutes.—*G. B. Rigg.*

METABOLISM (NITROGEN RELATIONS)

1329. Ammann, P. **Sur la grande richesse en matières azotées de certains maniocs du Cambodge.** [**On the large amount of nitrogenous matter in certain Cassavas of Cambodge.**] Compt. Rend. Acad. Sci. Paris 170: 1333–1334. 1920.—It is found that the amount of nitrogen compounds in these varieties is 2.93 per cent to 7.43 per cent as compared with the varieties of other localities which yield only 0.74 per cent to 1.49 per cent.—*C. H. Farr.*

1330. Bezagu, Maurice. **Variations de la respiration des cellules de feuille avec l'âge.** [**Variations in the respiration of cells of the leaf with age.**] Compt. Rend. Acad. Sci. Paris 169: 701–702. 1919.—Studies were made on the leaves of *Robinia pseudacacia*, *Pinus silvestris*, *Coboea scandens*, *Ligustrum vulgare*, *Althaea*, *Loroglossum hircinum*, and *Cercis siliquastrum*. Respiration, which is very weak in the young leaf, increases to a maximum which corresponds to the period at which the leaf reaches its full development. As the leaf becomes still older, the intensity of its respiration decreases.—*V. H. Young.*

1331. Bottomley, W. B. **The effect of nitrogen-fixing organisms and nucleic acid derivatives on plant growth.** Proc. Roy. Soc. London B, 91: 83–95. 1920.—The author has previously shown that *Lemna minor* grows much better when an extract of bacterized peat is added to inorganic nutrients, and in this investigation he tries to determine the factors responsible. Autoclaved growth masses of *Azotobacter chroococcum* added to Detmer's solution caused greatly increased growth and dry weight of plants over those grown in unmodi-

fied Detmer's solution. The same was found true when similar material of *Bacillus radicicola* was added. Similar results were obtained by use of crude nucleic acid derivatives from peat, but the pure adenine-uracil fraction was much less efficient. Neither the ash of nucleic acid derivatives nor of *Azotobacter* is effective in producing growth increase.—*Paul B. Sears.*

1332. Lampitt, Leslie Herbert. **Nitrogen metabolism in Saccharomyces cerevisiae.** Biochem. Jour. **13**: 459–486. *3 fig.* 1919.—The writer considers (1) factors which influence assimilation of nitrogen by yeast; (2) mechanism of the extraction of nitrogen from amino acids by yeast; (3) influence of available amino-acids and sugars on nitrogen assimilation; (4) apparent excretion of nitrogen by yeast. Under (1) he finds that active reproduction may result in a lowering of the nitrogen coefficient and that the final nitrogen coefficient is independent of the initial one. Under the second heading he finds the amidase described by Effront produces a non-volatile as well as a volatile acid. His third point of attack discloses that fermentative activity stimulates nitrogen assimilation, and desamination may continue after zymatic activity ceases. Excessive zymatic activity does not insure rapid N-assimilation. And fourth, during fermentation, the yeast constantly loses nitrogen to the liquid. Such nitrogen may be used again. An increase in sugar available for fermentation increases the rate of nitrogen excretion.—*Alva R. Davis.*

1333. Mazé, P., Villa, and Lemoigne. **Action de la cyanamide et de la dicyanodiamide sur le développement du maïs. [Action of cyanamide and dicyanodiamide on the development of maize.]** Compt. Rend. Acad. Sci. Paris **169**: 804–807. *1 fig.* 1919.—Experiments in France, Italy and Germany have shown that results from the use of calcium cyanamide are very variable. Certain authors have held that calcium cyanamide has a toxic effect, delaying the germination of seeds, while others hold that dicyanodiamide, a product of the polymerization of cyanamide, is the toxic agent. The effects of cyanamide and dicyanodiamide were tested with purified chemicals in culture media of definite composition. Cyanamide hinders the germination of maize at the concentration of 0.168 grams per liter both when added to solutions of nutrient minerals and when added to distilled water; dicyanodiamide on the other hand was found to be without effect. It was further shown that neither of the two substances under consideration is capable of serving as a source of nitrogen for maize.—*V. H. Young.*

1334. Mazé, P., Vila, and Lemoigne. **Transformation de la cyanamide en urée par les microbes du sol. [Transformation of cyanamide into urea by micro-organisms of the soil.]** Compt. Rend. Acad. Sci. Paris **169**: 921–923. 1919.—A previous note by the authors showed that pure cyanamide is very toxic to higher plants. The authors have isolated from the soil six species of bacteria among which are *Bacillus prodigiosus*, *B. coli*, and *B. cloacae*, which flourish in the presence of cyanamide in the proportion of 1–1000.—Cultures of these bacilli in bouillon were tested for their effect on cyanamide, and it was shown that while *B. coli* and one of the strains of *B. cloacae* do not break down cyanamide, the other species break it down with the formation of urea and in the absence of cyanamide urea was not formed. Traces of ammonia were produced in most cases of cyanamide decomposition. Further experiments with a miscellaneous collection of bacteria from milk, soil and dung showed that they did not break down cyanamide nor form urea except in the case of certain forms of *B. cloacae* and *B. subtilis*. *Penicillium glaucum* and two species of yeasts were shown to have the power of breaking down cyanamide and forming urea. The authors conclude that cyanamide may be transformed into urea by many soil organisms and this transformation should be rapid except in acid soils.—*V. H. Young.*

1335. Wann, F. B. **The fixation of nitrogen by green plants.** Science **51**: 247. 1920.—In the experiments recorded here seven species of grass-green algae were used, all except one being isolated from soil and grown in pure culture. The cultures were made in 500 cc. flasks on approximately 150 gm. of accurately weighed mineral nutrient agar. The full nutrient solution contained 0.5 gm. NH_4NO_3 per liter, and in the various series this source was replaced by $(NH_4)_2SO_4$, $Ca(NO_3)_2$, asparagin, glycocoll, urea. In all cultures nitrogen as such was present in approximately equal quantities, and each nitrogen source was set up in duplicate

series, with and without 1 per cent glucose. NH_4NO_3, $Ca(NO_3)_2$, and $(NH_4)_2SO_4$ were also used in the presence of mannite. At the end of from 5 to 7 months the cultures were analyzed for total nitrogen, the Gunning-Kjeldahl method being used for media free from nitrates, and the Förster modification where nitrates were present. In the urea, glycocoll, asparagine and $(NH_4)_2SO_4$ series no marked increase or decrease occurred either in the presence or absence of glucose or mannite. Marked increases were found in NH_4NO_3 and $Ca(NO_3)_2$ media in the presence of glucose, the amount of fixation ranging from 6 to 10 mgm. per culture in the 1917–1918 experiments and from 4 to 13 mgm. in the 1919 experiments. This represented an increase in total nitrogen ranging from 17 to 55 per cent. Fixation was common to all species. The amount of fixation varied somewhat with the different species and seemed to be related to the intensity of growth.—*A. H. Chivers.*

1336. Warburg, Otto. **Über die Reduktion der Salpetersäure in grünen Zellen. [The reduction of nitric acid in green cells.]** Naturwissenschaften **8**: 594–596. 1920.—Little is known of the conditions of reduction in higher plants as it is usually covered up by the oxidation processes. Warburg has succeeded, however, in increasing the rate of reduction to such an extent that the chemical nature of the process can be studied. He used in his experiments the alga *Chlorella vulgaris* Beyerinck and by growing it in dilute solutions of nitric acid was able to stimulate the reduction of nitrates to such an extent that in darkness the reduction made up 55 per cent of the entire metabolism, and in light a much greater part, without injurious effect on the alga.—*Orton L. Clark.*

METABOLISM (ENZYMES, FERMENTATION)

1337. Colin, H. **L'inulase du Topinambour. [The inulase in Jerusalem artichoke.]** Rev. Gen. Bot. **32**: 247–255. 1920.—The author finds that the tubercles of Jerusalem artichoke are not an exceptionally good source of inulase. Colin finds that "helianthenine" is not a stage in the breaking down of inulin, and in this he disagrees with Green.—*J. M. Brannon.*

1338. Colin, H. **Sur l'inversion diastasique du saccharose; influence des produits de la réaction sur la vitesse d'hydrolyse. [On the diastatic inversion of saccharose: the influence of the products of the reaction on the rate of hydrolysis.]** Compt. Rend. Acad. Sci. Paris **169**: 849–852. 1919.—The author has previously shown that diminution of the rate of reaction of invertase with increase in the amount of saccharose present is to be imputed to increased viscosity of the solution and that the rate of reaction is a linear function of the fluidity of the solution. In order to determine the specific effect of the end products of the inversion of saccharose on the rate of inversion, invert sugar, levulose, and glucose were added to mixtures of saccharose and invertase and their effect on the rate of reaction was noted. It is concluded that the rate of hydrolysis of saccharose is primarily a function of the fluidity of the solutions, and the retarding effect of glucose, levulose, and invert sugar on this rate is attributed to the augmentation of the viscosity of the medium. The products of the reaction exert no other effect on the rate of inversion than would some other neutral substance, glycerine for example, which increased the viscosity of the liquid in a similar fashion.—*V. H. Young.*

1339. Flohil, J. T. **Volumetric method for the determination of diastatic capacity.** Jour. Indust. Eng. Chem. **12**: 677. 1920.

1340. Gore, H. C. **Occurrence of diastase in the sweet potato in relation to the preparation of sweet potato syrup.** Jour. Biol. Chem. **44**: 19–20. 1920.—Sweet potatoes are high in diastatic power, and it is possible to convert nearly all of their starch into soluble carbohydrates by slowly cooking the potatoes in water.—*G. B. Rigg.*

1341. Kopeloff, N. **Effect of varying the amount of inoculum and concentration on the deterioration of sugar by molds.** Jour. Indust. Eng. Chem. **12**: 455–457. 1920.—An increase in the number of mold spores inoculated into sugars (with films of varying concentration) is responsible for an increase in deterioration. The amount of deterioration also increases with a decrease in concentration of the films surrounding the sugar crystals.—*Henry Schmitz.*

1342. Kopeloff, N., Lillian Kopeloff, and C. J. Welcome. **Formation of the gum, levan, by mold spores. I. Identification and quantitative determination. II. Mode of formation and influence of reaction.** Jour. Biol. Chem. 43: 171–187. 1920.—Mold spores (*Aspergillus Sydowi* Bainier) contain an enzyme (levanase) capable of forming the gum, levan, in sucrose solution of all concentrations up to the saturation point.—*G. B. Rigg.*

1343. Kopeloff, N., and H. Z. E. Perkins. **The deterioration of Cuban raw sugars in storage.** Jour. Indust. Eng. Chem. 12: 555–558. 1920.—When Cuban raw sugar is held 5.5 months under storage conditions there is a loss in polarization. The loss in polarization in each instance has generally been accompanied by a gain in reducing sugars, indicating that the loss is a true inversion due to microbiological agencies.—*Henry Schmitz.*

1344. Neuberg, C., and Elsa Reinfurth. **Über den Chemismus der alkoholischen Gärung, zugleich Bemerkungen zur gleichnamigen Mitteilung von E. Zerner.** [**The chemistry of alcoholic fermentation.**] Ber. Deutsch. Chem. Ges. 53: 462–469. 1920.—A critical discussion of Zerner's work. The authors, working along the same line as Zerner, obtained similar results, but deduced different conclusions.—*Henry Schmitz.*

1345. Neuberg, C., and Elsa Reinfurth. **Über die Vergärbarkeit der Brenztraubensäure unter den Bedingungen des Abfangverfahrens.** [**Concerning the fermentability of pyruvic acid with the removal of intermediate products.**] Ber. Deutsch. Chem. Ges. 53: 1039–1052. 1920.—The author demonstrates by eleven different methods that pyruvic acid may be fermented by yeasts in the presence of sodium bisulphite, and interprets this fact as evidence in support of the acetaldehyde-pyruvic acid theory of fermentation.—*Henry Schmitz.*

1346. Peterson, W. H., and E. B. Fred. **The production of acetaldehyde by certain pentose-fermenting bacteria.** Jour. Biol. Chem. 44: 29–46. 1920.—In the presence of a fixative, such as calcium sulphite, acetaldehyde is formed in the fermentation of carbohydrates by *Bacillus acetoethylicum*, *Lactobacillus pentoaceticus* and also by an undetermined organism. Aldehyde is produced from glucose and starch but the maximum yield is obtained from xylose. The production of acetaldehyde is correlated with the production of alcohol, an increase in the former results in a decrease in the latter.—*G. B. Rigg.*

1347. Raistrick, Harold. **Studies on the cycloclastic power of bacteria. Part I. A quantitative study of the aerobic decomposition of histidine by bacteria.** Biochem. Jour. 13: 447–458. *Fig. 7.* 1919.—*Bacillus paratyphosus A*, *B. paratyphosus B*, *B. faecalis alcaligenes*, and *B. pyocyaneus* are able to break the iminazole ring since they produce ammonia both from the side chain and from the iminazole nucleus of the histidine molecule. *B. proteus vulgaris* produces ammonia from the side chain nitrogen only.—*Alva R. Davis.*

1348. Rector, Thos. M. **Lipolytic enzymes in olive oil.** Jour. Indust. Eng. Chem. 12: 156–158. 1920.—A fat-hydrolyzing enzyme, which is totally destroyed by heating the oil at 150°C. for 15 minutes, and which retains its activity for a number of years, is contained in untreated, filtered olive oil.—*Henry Schmitz.*

1349. Schoorl, N. **Die Volumenänderung bei der Saccharose-Inversion.** [**Volume changes with saccharose inversion.**] Zeitschr. Untersch. Nahrungs- u. Genussmittel 39: 113–121. 1920.

1350. Speakman, H. B. **Gas production during the acetone and butyl alcohol fermentation of starch.** Jour. Biol. Chem. 43: 401–411. 1920.

1351. Zerner, E. **Über den Chemismus der alkoholischen Gärung.** [**The chemistry of alcoholic fermentation.**] Ber. Deutsch. Chem. Ges. 53: 325–334. 1920.—Evidence is presented to show that when sodium sulphate is added to fermentation cultures glycerine and acetaldehyde are intermediate products and occur along with alcohol. Under normal conditions (without sodium sulphite) these two first-named products are not formed.—*Henry Schmitz.*

METABOLISM (RESPIRATION)

1352. Bailey, C. H., and A. M. Gurjar. **Respiration of cereal plants and grains. II. Respiration of sprouted wheat.** Jour. Biol. Chem. **44**: 5–7. *1 fig.* 1920.—Respiration proceeds at a higher rate in the sprouted wheat than in normal wheat. At 12.5 to 14 per cent water content the ratios of the respiratory rate in (1) normal wheat, (2) wheat germinated 24 hours, (3) wheat germinated 48 hours was not far from the ratios of their reducing sugar content.—*G. B. Rigg.*

1353. Bailey, C. H., and A. M. Gurjar. **Respiration of cereal plants and grains. III. Respiration of rice paddy and milled rice.** Jour. Biol. Chem. **44**: 9–12. *Fig. 1.* 1920.—The germ, or the embryo, is the seat of the most active respiration in a typical grain.—*G. B. Rigg.*

1354. Bailey, C. H., and A. M. Gurjar. **Respiration of cereal plants and grains. IV. The respiration of frosted wheat plants.** Jour. Biol. Chem. **44**: 13–15. 1920.—Frozen plants respired more vigorously during the first 24 hours after thawing than did plants that had not been frozen.—*G. B. Rigg.*

ORGANISM AS A WHOLE

1355. Buder, Johannes. **Aus der Biologie der Purpurbakterien. [The biology of the purple bacteria.]** Naturwissenschaften **8**: 261–268. *2 fig.* 1920.—This paper brings together some of the latest results which contribute to the biology of this unique group. It discusses, first, the different members of the group and their classification according to their sulphur content and pigmentation. Absorption curves of bacteriopurpurin as well as one of the living bacteria themselves are reproduced, together with a figure showing the characteristic gathering of the bacteria in different regions of the spectrum. This last shows an unusual response of the bacteria to ultra red rays, the physiological and ecological significance of which is discussed. The phototactic movements of the purple bacteria are also considered.—*Orton L. Clark.*

1356. Galippe, V. **Des micro-organismes vivant dans le papier; leur résistance à l'action de la chaleur et à celle du temps. [The micro-organisms of paper; their resistance to the action of heat and weather.]** Compt. Rend. Acad. Sci. Paris **169**: 814–817. 1919.—Examination of ancient papers and papyrus demonstrated the presence of large numbers of micro-organisms which were secured in pure cultures. The author concludes from his studies that many bacteria are extremely resistant to the action of various unfavorable factors of their environment and are capable of existing for long periods of time.—*V. H. Young.*

1357. Joffe, Jacob S. **The influence of soil reaction on the growth of alfalfa.** Soil Sci. **10**: 301–307. *1 fig.* 1920.—See Bot. Absts. 7, Entry 1398.

1358. Whiting, A. L., and Roy Hansen. **Cross-inoculation studies with the nodule bacteria of lima beans, navy beans, cowpeas, and others of the cowpea group.** Soil Sci. **10**: 291–300. 1920.—See Bot. Absts. 7, Entry 1406.

GROWTH, DEVELOPMENT, REPRODUCTION

1359. Blackman, V. H. **The significance of the efficiency index of plant growth.** New Phytol. **19**: 97–100. 1920.—This is an answer to the paper by Kidd, West, and Briggs. It is pointed out that "the efficiency index does nevertheless give a measure of the plant's *average* efficiency *during any particular period.*"—*I. F. Lewis.*

1360. Bose, J. C. **Researches on growth of plants.** Nature **105**: 615–617. *3 fig.* 1920. —Brief descriptions of methods, figures of the high magnification crescograph and of some records.—*O. A. Stevens.*

1361. Kidd, Franklin, Cyril West, and G. E. Briggs. **What is the significance of the efficiency index of plant growth?** New Phytol. 19: 88–96. *2 fig.* 1920.—This is a critique of the compound interest conception of plant growth advocated by V. H. Blackman and applied by Brenchley in the comparison of the efficiency of different plants.—*I. F. Lewis.*

1362. Heinicke, Arthur J. **Concerning the shedding of flowers and fruits and other abscission phenomena in apples and pears.** Proc. Amer. Soc. Hort. Sci. 16: 76–83. 1920.—See Bot. Absts. 7, Entry 977.

1363. Mitscherlich, E. A. **Zum Gesetze des Pflanzenwachstums. [Regarding the law of plant growth.]** Fühlings Landw. Zeitg. 68: 419–426. 1919.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1364. Guttenberg, Hermann von. **Der heutige Stand der Statolithentheorie des Geotropismus. [The present status of the statolith theory of geotropism.]** Naturwissenschaften 8: 571–577. *3 fig.* 1920.—A review is given of the recent work of Zollikofer, Buder, Richter, and others which add evidence in support of Haberlandt's and Nemec's theory which has called forth so much discussion and experimental work. The arguments of the opponents of this theory (Fitting, Jost, Zielinski, F. & G. Weber, and Heilbronn) are taken up in detail.—*Orton L. Clark.*

1365. Pütter, A. **Das Gesetz der Reizschwelle. [The law of the threshold of stimulation.]** Naturwissenschaften 8: 501–507. 1920.—This paper attempts to show in how far it has been possible to go into a physico-chemical analysis of the threshold of stimulation. This is given in detail for electrical and light stimuli, with a consideration of the formulae of Nernst and Hill for the first, and Pütter's own formula for the latter. The difference in the effect of electrical and light stimuli is also pointed out. Light, gravity, and electrical stimuli are grouped as those which may instantly affect the plant at full strength, whereas chemical osmotic, and heat stimuli are effective only after the diffusion of the agents, and a certain time factor is requisite. It is not possible to express in any one formula a general law for the threshold of stimulation, but different equations are required, and these vary with the type of stimuli. In summarizing Pütter feels that the necessary conditions of the threshold of stimulation may be expressed as "a sensitiveness in a living system when in the system, or at a certain point in it, the concentration of certain active substances reach, in a definite time, a certain magnitude, which is constant for the different systems and different stimuli."—*Orton L. Clark.*

1366. Small, James. **A theory of geotropism: with some experiments on the chemical reversal of geotropic response in stem and root.** New Phytol. 19: 49–63. *1 pl., 5 fig.* 1920.—A statement is made of certain hypotheses previously advanced to explain the difference in electrical condition of the upper and under side of a horizontally placed root, and of geotropic response in general. Curvature is explained on the basis of five postulations. (1) The protoplasm of the root is characterized by a condition of comparative acidity on the basis of the H-ion concentration as compared with the iso-electric point of the amphoteric colloids present. (2) The protein, or protein-lipoid, disperse phase in the root becomes therefore electropositive. (3) There is greater polarization on the upper side of any cell and therefore a higher potential in the upper region of the root. (4) An action current flows, therefore, from the upper to the lower side of the perceptive region; on account of the resistance, its maximum effect is produced on the under side of the root. (5) The polarization of the lower cells is thus lowered, their permeability is increased, and the familiar bending phenomena are brought about.—Geotropic response of stems is explained on the same basis, the protoplasm however being electronegative and the flow of the action current being in the reverse direction from that in the root.—Experiments are cited to render greater probability to the theory. Roots of *Vicia Faba* and maize when grown in an atmosphere containing a low concentration of ammonia showed reversal of the usual geotropic response. Conversely, stems became positively

geotropic when grown in an atmosphere containing acetic acid.—From the experiments it is concluded that the stem may be considered "of an 'alkaline' nature with electronegative particles in the disperse phase of the plasma membrane and that the root is of an 'acid' nature with electropositive particles."—Theoretical explanations are also given of the orientation of secondary and tertiary roots and stems.—*I. F. Lewis.*

GERMINATION, RENEWAL OF ACTIVITY

1367. Kidd, Franklin, and Cyril West. **The rôle of the seed-coat in relation to the germination of immature seed.** Ann. Bot. **34**: 439–445. 1920.—The germination of unripe mustard seeds and peas from which the seed-coats had been removed was compared with that of intact unripe seeds and with that of ripe seeds. It was found that the removal of the testa accelerated germination, terminated the dormant period and increased the percentage of germination. It is concluded that the presence of the testa is largely responsible for the dormant period when attempts are made to germinate unripe seeds, and evidence is presented to show that the effect is due to the living testa limiting the gaseous exchange of the embryo.—*W. P. Thompson.*

1368. Hill, A. W. **Studies in seed germination. Experiments with Cyclamen.** Ann. Bot. **34**: 417–429. *Pl. 20, 15 fig.* 1920.

TEMPERATURE RELATIONS

1369. Kiesselbach, T. A., and J. A. Ratcliff. **Freezing injury of seed corn.** Nebraska Agric. Exp. Sta. Res. Bull. 16. *96 p., 22 fig.* 1920.—See Bot. Absts. 7, Entry 623.

1370. Manaresi, Angelo. **Sui danni prodotti ai fiori degli alberi fruttiferi dalle gelate primaverili in genere e da quelle in particolare dei giorni 28, 29 e 30 marzo 1918. [Damage to flowers of fruit trees by spring frosts and in particular the frosts of the 28, 29 and 30 of March, 1918.]** Rev. Patol. Veg. **10**: 1–26. 1919.—See Bot. Absts. 7, Entry 986.

RADIANT ENERGY RELATIONS

1371. Feuer, B., and F. W. Tanner. **The action of ultraviolet light on the yeast-like fungi. I.** Jour. Indust. Eng. Chem. **12**: 740–741. 1920.—The data obtained indicate that yeast cells are not very resistant to ultraviolet light. A majority of the organisms studied were killed after an exposure to the rays of less than one minute.—*Henry Schmitz.*

1372. Kögel, P. R. **Über Photodynamie. [Photodynamics.]** Zentralbl. Gesamte Landw. **1**: 288–292. 1920.—Review of recent work, with bibliographical citations.—*D. Reddick.*

1373. Laurens, H., and H. D. Hooker, Jr. **The sensibility of Volvox to wave-lengths of equal energy content.** Jour. Exp. Zool. **30**: 345–368. 1920.—The stimulation-time and the rate of locomotion were ascertained in different regions of the spectrum all equal in energy. The maximum effect in both was found to be near wave-length 494 $\mu\mu$. From this region the effect decreased rapidly in both directions. These results agree closely with those obtained by Mast on *Chlamydomonas* and blow-fly larvae; but they are at considerable variance with those obtained on the more nearly related forms, *Pandorina, Eudorina* and *Spondylomorum.* —*S. O. Mast.*

TOXIC AGENTS

1374. Greig-Smith, R. **The germicidal activity of the Eucalyptus oils. Part 2. The action of the oils in aqueous dilutions.** Proc. Linn. Soc. New South Wales **44**: 311–347. *7 fig.* 1919. —See Bot. Absts. 7, Entry 1282.

1375. Montemartini, Luigi. **Nuove osservazioni sopra l'azione eccitante del sulfato di rame sulle piante. [The stimulating action of copper sulfate on plants.]** Rev. Patol. Veg. **10**: 36–40. 1920.—Tests were made by spraying one side of a plant and leaving the other unsprayed. When half of the leaves were treated in the morning with a dilute copper sulphate solution and removed in the evening, measured, and the dry weight determined, it was found that the treated leaves had a greater dry weight per unit area. When the leaves were treated at night and removed in the morning, they had a lower dry weight per unit area. This indicates that the treatment stimulated the formation and translocation of organic matter.—*F. M. Blodgett.*

1376. Nemec, Antoine, and Francois Stranak. **Contribution à l'étude de l'influence toxique des terpenes a l'égard de quelques végétaux supérieurs. [The toxic action of terpenes on higher plants.]** Rev. Gén. Bot. **32**: 241–246. 1920.—Seedlings of *Vicia Faba*, *Zea Mays*, and *Lupinus Luteus* were grown on Knop's solution in cylinders of twenty liters capacity. The terpenes used were menthol, terpineal, pinène and borneal.—When etiolated seedlings of *Vicia Faba* were exposed to the action of the terpenes, black spots appeared on the surface of the leaves which later became more prominent. Then the stem turned gray and finally black. A "mucous" appears on the stem which has an acid reaction. The plant finally loses turgor and wilts. The ramification of the roots are checked.—Internally the blackening is localized in different regions, as in the cambium. In the root the effect of the vapors occurs first in the recently formed positions of the vascular tissue, and later the remainder is affected. Finally the root forms a tissue (calyphogène) which acts as a protecting layer against the vapors of the terpenes.—The plants experimented with show different degrees of resistance to the vapors of the terpenes.—*J. M. Brannon.*

1377. Perry, Margaret C., and G. D. Beal. **The quantities of preservatives necessary to inhibit and prevent alcoholic fermentation and the growth of molds.** Jour. Indust. Eng. Chem. **12**: 253–257. 1920.—*Aspergillus Sydowi*, *Aspergillus niger*, and *Penicillium expansum* in the order named, effected the greatest deterioration in both molasses and sugar. There is also evidence that an increase in inoculum is responsible for an increase in inversion at a definite concentration.—*Henry Schmitz.*

1378. Rusk, Hester M. **The effect of zinc sulphate on protoplasmic streaming.** Bull. Torrey Bot. Club **47**: 425–431. *2 fig.* 1920.—Since metallic poisons in minimal doses stimulate metabolic activity in plants, it was thought that ocular evidence of excitation might be observed in individual cells. Zinc sulphate was used and its effect on rate of streaming was noted in *Elodea* and in *Chara*. Acceleration was evident in both plants, *Elodea* being more sensitive than *Chara*, but with a less maximum acceleration.—*P. A. Munz.*

PHYSIOLOGY OF DISEASE

1379. Harvey, R. B. **Hydrogen-ion changes in the mosaic disease of tobacco plants and their relation to catalase.** Jour. Biol. Chem. **42**: 397–400. 1920.—The H-ion concentration of juice expressed from mosaic tobacco leaves was found to be somewhat greater than that from healthy plants. Catalase activity in the mosaic leaves is decreased with increasing hydrogen-ion concentration.—*G. B. Rigg.*

MISCELLANEOUS

1380. Bradford, Samuel Clement. **On the theory of gels. II. The crystallization of gelatin.** Biochem. Jour. **14**: 91–93. 1920.

1381. Krogh, August. **The calibration, accuracy and use of gas meters.** Biochem. Jour. **14**: 282–289. *2 fig.* 1920.—This article refers to gas meters employed in physiological research.—*A. R. Davis.*

1382. Krogh, August. **A gas analysis apparatus accurate to 0.001 per cent, mainly designed for respiratory exchange work.** Biochem. Jour. 14: 267–281. *4 fig.* 1920.

1383. Martin, Charles James. **The preparation of Sörensen's phosphate solutions when the pure salts are not available.** Biochem. Jour. 14: 98. 1920.

1384. Mutscheller, Arthur. **Colloidal adsorption.** Jour. Amer. Chem. Soc. 42: 2142–2160. 1920.

1385. Schmit-Jensen, Hans Oluf. **Estimation of carbon dioxide, oxygen and combustible gases by Krogh's method of micro-analysis.** Biochem. Jour. 14: 4–24. *2 fig.* 1920.—A detailed description is given of Krogh's method as modified by the author. Special emphasis is placed upon the value of the method in biological work.—*Alva R. Davis.*

SOIL SCIENCE

J. J. Skinner, *Editor*
F. M. Schertz, *Assistant Editor*

GENERAL

1386. Alway, F. J. **Agricultural value and reclamation of peat soils.** Minnesota Agric. Exp. Sta. Bull. 188: 1–136. *54 fig.* Mar., 1920.—The peat soils of the state are divided into groups of high and low lime content. On the high lime peats, applications of lime are of no advantage and sufficient nitrogen becomes available as farm and garden crops need this element. The high lime peats are classed according to their need for chemical fertilizers. Low lime peats need both lime and nitrogen applications. Ascertaining the fertilizer requirements of individual tracts is always advisable. Drainage, water level control, and heavy rolling are necessary. Burning is advised only after careful consideration of the local conditions. —Extensive drainage of peat soils before reclamation operations are to be started is inadvisable. The advisability of entering on reclamation work with peat depends upon location and facilities for operation.—*A. C. Arny.*

1387. Bear, Firman E. **Chemical analysis of soils.** Ohio Agric. Exp. Sta. Monthly Bull. 5^8: 227–232. 1920.—Chemical analyses of soils are valuable as a guide to the planning of permanent systems of soil improvement, as an index to the direction in which the supply of plant food is moving, as a basis for interpretation of experimental data from different soils, as a guide to the application of results obtained on experimental farms and gives definite information as to the potential fertility of a soil.—*R. C. Thomas.*

1388. [C., C.] **Soils and manures.** [Rev. of: Wild, L. J. **Soils and manures in New Zealand.** *134 p.* Whitcombe and Tombs: Auckland, Melbourne and London, 1919. Also of: Russell, E. J. **A students' book on soils and manures.** 2nd ed., *XII + 240 p.* University Press: Cambridge, 1919]. Nature 105: 130–131. 1920.

1389. Clarke, Frank Wigglesworth. **The data of geochemistry.** U. S. Geol. Surv. Bull. 695. *832 p.* 4th edition. 1920.—The chemical constituents of the earth's crust are given together with certain general conclusions.—*C. V. Piper.*

1390. Collinson, R. C. **A progress report of fertilizer experiments with fruits.** New York Agric. Exp. Sta. [Geneva] Bull. 477. *53 p.* 1920.

1391. Findlay, Hugh. **The handbook for practical farmers.** *558 p., 258 fig.* D. Appleton & Company: New York and London, 1920. See Bot. Absts. 7, Entry 609.

1392. Fortier, S. **Relation to orchard irrigation practice.** Monthly Bull. California State Commission Hortic. 7: 361–367. 1919.—Arid soils in general and orchard soils in particu-

lar need abundant water and organic matter. The part played by capillarity in the upward moving of water has been overestimated. It is held that gravity acts upon capillary as well as free water. The writer concludes in pointing out the relative advantages and disadvantages of the basin method and furrow method of irrigation of fruit trees.—*E. L. Overholser.*

1393. Headley, F. B. **Unreliable experimental methods of determining the toxicity of alkali salts.** Science **51**: 140–141. Feb., 1920.—The method frequently used by investigators of adding certain percentages of salts to soils, planting them to crops, and estimating the toxicity by depression of crop growth, has led to erroneous conclusions. It has been shown that soils absorb a part at least of salts added, and that the crop growth is much more closely related to the proportion of alkali salts recoverable from the soils than to the proportion of salts that have been added. The conclusions in two papers on the subject, published by Harris, and Harris and Pittman, respectively, are criticized as unjustified, on account of the fact that the salts recoverable by analysis after the treatments were made were not taken into consideration.—*A. H. Chivers.*

1394. Mockeridge, Florence Annie. **The occurrence and nature of the plant growth promoting substances in various organic manurial composts.** Biochem, Jour. **14**: 432–450. 1920.—See Bot. Absts. 7, Entry 1318.

1395. R., E. J. **A standard book on soils.** [Rev. of: Hall, A. D. **The soil: an introduction to the scientific study of the growth of crops.** 3d ed. *XV + 352 p.* John Murray: London, 1920.] Nature 105: 384, 1920.—"Its distinguishing feature is its clear recognition of the complexity of the soil problem."—*O. A. Stevens.*

1396. Stead, Arthur. **The agriculture and soils of the Cape Province. I. Witkop-Burghersdorp.** Jour. Dept. Agric. Union of South Africa I: 429–441, 660–670. 1920.

1397. Williams, C. B. **Report of the Division of Agronomy.** North Carolina Agric. Exp. Ann. Rept. **42**: 21–39. 1920.—See Bot. Absts. 7, Entry 677.

SOIL ACIDITY

1398. Joffe, Jacob S. **The influence of soil reaction on the growth of alfalfa.** Soil Sci. **10**: 301–307. *Fig. 1.* 1920.—Pot experiments with alfalfa were carried out in soil to which varying quantities of sulfuric acid or calcium carbonate were added. The hydrogen-ion exponent of the soil was determined by Gillespie's method at the beginning, during, and at the end of the experiment. The germination of alfalfa seed was practically the same in soils varying from Ph. 4.5–7.0 but was greatly reduced in soils below Ph. 4.5. The yields of tops showed a gradual increase with an increase of Ph. from 3.8–7.0. The nodule production and nitrogen content of the plants increased with decreasing hydrogen-ion concentration.—*W. J. Robbins.*

1399. Knight, H. G. **Acidity and acidimetry of soils. I. Studies of the Hopkins and Pettit method for determining soil acidity.** Jour. Indust. Eng. Chem. **12**: 340. 1920.—A detailed account of cation and anion absorption by soil is presented.—*Henry Schmitz.*

1400. Knight, H. G. **Acidity and acidimetry of soils. II. Investigation of acid soils by means of the hydrogen electrode.** Jour. Indust. Eng. Chem. **12**: 457–464. 1920.—A new hydrogen electrode has been designed which has proved satisfactory for certain types of soil investigation. Various reactions and effects of acid soils are discussed.—*Henry Schmitz.*

1401. Knight, H. G. **Acidity, and acidimetry of soils. III.—Comparison of methods for determining lime requirements of soils with hydrogen electrode. IV.—Proposed method for determination of lime requirements of soils.** Jour. Indust. Eng. Chem. **12**: 559–562. 1920.—A method is proposed for determining the power of a soil to decompose calcium carbonate

which approximates the results obtained by use of the hydrogen electrode. The Hopkins and hydrogen electrode methods show the highest percentage consistency for measuring the reduction of acidity for limed soils.—*Henry Schmitz.*

INFLUENCE OF BIOLOGICAL AGENTS

1402. Ames, J. W. **Supply of nitrogen in the soil.** Ohio Agric. Exp. Sta. Monthly Bull. 6[54]: 174–178. *3 tables.*—Information concerning changes of the nitrogen supply of the soil occasioned by differences in treatment, under cultivation, with fertilizers, lime and manure, is gained by a comparison of the nitrogen content of fertility plots on the Wooster farm.—*R. C. Thomas.*

1403. Ellett, W. B., and W. G. Harris. **Coöperative experiments for the composting of phosphate rock and sulfur.** Soil Sci. 10: 315–325. 1920.—Using composts of soil and rock phosphate; soil, rock phosphate and sulfur; soil, rock phosphate, sulfur and manure, inoculated and uninoculated with sulfofying microorganisms, the water soluble, ammonium-citrate-soluble and total phosphoric acid as well as the sulfuric acid, total nitrogen, nitrate and ammonia were determined. The results show that the addition of manure to a compost of soil, sulfur and rock phosphate increases the availability of the rock phosphate. All Virginia soils have some sulfofying power. The composting of sulfur, soil, rock phosphate, and manure is not recommended for the use of farmers because of the slowness of the process and mechanical difficulties.—*W. J. Robbins.*

1404. Lipman, J. G., and J. S. Joffe. **The influence of initial reactions on the oxidation of sulfur and the formation of available phosphates.** Soil Sci. 10: 327–332. *2 fig.* 1920.—Varying quantities of sulfuric acid were added to soil containing 15 per cent rock phosphate and 5 per cent sulfur. The hydrogen-ion exponent of the soils varied from Ph. 4.7–5.4. The soluble phosphates and hydrogen-ion concentrations were determined weekly. By the end of the 12th week the hydrogen-ion exponent had fallen to Ph. 1.4–2.0 but little further change occurred. The amount of soluble phosphate increased during the 20 weeks of the experiment reaching 83 to 85 per cent but no influence of the initial reaction on the formation of the soluble phosphates was noted.—*W. J. Robbins.*

1405. Mazé, P., Vila et Lemoigne. **Transformation de la cyanamide en urée par les microbes du sol. [Transformation of cyanamide into urea by micro-organisms of the soil.]** Compt. Rend. Acad. Sci. Paris 169: 921–923. 1919.—See Bot. Absts. 7, Entry 1334.

1406. Whiting, A. L., and Roy Hansen. **Cross-inoculation studies with the nodule bacteria of lima beans, navy beans, cowpeas and others of the cowpea group.** Soil Sci. 10: 291–300. 1920.—Pot experiments with leguminous plants and pure cultures of *B. radicicola* show that the nodule bacteria of the lima bean (*Phaseolus lunatus*) are distinct from those of the navy and kidney bean (*Phaseolus vulgaris*) but are identical with those of the cowpea. (*Vigna sinensis*).—*W. J. Robbins.*

1407. Wright, R. C. **Nitrogen economy in the soil as influenced by various crops grown under control conditions.** Soil Sci. 10: 249–289. *9 fig.* 1920.—Leguminous and non-leguminous crops were grown in containers holding about 100 lbs. of soil. Nitrogen in the plant and in the soil was determined. Under the conditions of the experiment the fallow soil showed a loss of nitrogen. Under some crops there was an absolute loss of nitrogen in excess of that recovered in the crop and this varied with the crop and soil. Legumes may show this loss as well as non-legumes. When nitrogen fixation takes place in the growth of legumes the removal of the crop above ground depletes the soil of nitrogen just as if a non-leguminous crop had been grown.—*W. J. Robbins.*

FERTILIZATION

1408. Burgess, J. L. Part I. **The relative availability of acid phosphate and the native soil phosphates in the presence of pulverized limestone.** Part II. **Future of the agricultural lime industry.** Bull. North Carolina Dept. Agric. 41²: 5–24. 1920.—The first part is a compilation of opinions on the influence of lime in rendering potash available. The second part is an expression of opinion that lime is to be regarded as a fertilizer element.—*F. A. Wolf.*

1409. Hibbard, R. P., and S. Gershberg. **The biological method of determining the fertilizer requirement of a particular soil or crop.** Michigan Acad. Sci. Ann. Rept. 21: 223–224. 1919.—See Bot. Absts. 6, Entry 1419.

1410. Jordan, W. H. **Soil studies: I. The influence of fertilizers upon the productiveness of several types of soil. II. The influence of fertilizers and plant growth upon soil solubles.** New York Agric. Exp. Sta. [Geneva] Bull. 473. *27 p.* 1920.—Part I deals with a series of forcing-house experiments in which peat, stable manure, and commercial fertilizers, in varying proportions, were applied to several kinds of soil in which barley was grown. Perhaps the most interesting feature of these experiments was the fact that a sandy soil of an inferior type for general cropping produced twice as much dry substance in boxes to which no fertilizer was applied as did a clay loam soil notably fertile in field culture. In Part II an account is given of experiments in which it was shown that the application of soluble compounds of nitrogen, phosphorus, and potassium to various kinds of soil increased the proportion of water soluble in the soil. It was also shown that a growing crop (barley) utilizes the soluble material and rapidly reduces the quantity of such material in the soil even while the plants are in an early stage of growth.—*F. C. Stewart.*

1411. Mazé, P., Vila and Lemoigne. **Action de la cyanamide et de la dicyanodiamide sur le développement du mais. [Action of cyanamide and dicyanodiamide on the development of maize.]** Compt. Rend. Acad. Sci. Paris 169: 804–807. *1 fig.* 1919.—See Bot. Absts. 7, Entry 1333.

1412. Plummer, J. K., and Wolf, F. A. **Borax injury to crops.** North Carolina Dept. Agric. Bull. 41¹⁵: 1–20. *Fig. 8.* 1920.—Field observations made in 1919 indicated that considerable damage to crops in North Carolina had resulted from the use of fertilizers containing borax. The injury manifested itself by death and stunting of plants so that the stands were not uniform, plants of the same age differed in size, and yields, in consequence, were greatly decreased.—The present investigation with corn and cotton on Cecil clay loam and cotton and tobacco on Durham sandy loam in pot cultures agrees with field observations in showing that plants are more susceptible to injury on the lighter soils.—In sandy soil, as little as one pound of anhydrous borax per acre injured tobacco and no cotton grew in any pots containing over five pounds per acre. In clay soil, both cotton and corn showed marked injury when the amounts of borax exceeded seven pounds of anhydrous borax per acre, but the plants survived in these series.—The tobacco plants which were poisoned in the third transplanting gradually recovered and after two months were apparently normal, thus presenting a condition similar to that found in the field.—The corn plants on sandy soil, to which borax at the rate of 5 pounds per acre was applied, showed considerable injury whereas, with an application of 10 pounds per acre, they were entirely lacking in green color and soon died.—Interference with color formation by boron does not appear to be related to the assimulation of iron nor to plastid formation.—There is no reason to believe borax will remain in the soil and cause damage to crops succeeding those which have been injured by borax. Borax disappears from the zone occupied by roots by leaching.—*F. A. Wolf.*

1413. Schreiner, Oswald, B. E. Brown, J. J. Skinner, and M. Shapovalov. **Crop injury by borax in fertilizer.** U. S. Dept. Agric. Circ. 84: 3–35. *25 fig.* 1920.—See Bot. Absts. 6, Entry 1431.

FERTILIZER RESOURCES

1414. Anonymous. **The nitrogen problem; by-products.** [Rev. of: Anonymous. **Ministry of munitions of war. Munitions inventions department. Nitrogen products committee. Final report.** *VI + 357 p.* H. M. Stationery office: London, 1919.] Nature **105**: 201–202. 1920.—See also Bot. Absts. 7, Entry 1417.

1415. Anonymous. **The manufacture of synthetic ammonia and production of nitrates.** Nature **105**: 312. 1920.—Note on beginning of work by the government. See also Bot. Absts. 7, Entry 1417. (The Nitrogen problem. Nature **104**: 533.)—*O. A. Stevens.*

1416. Anonymous. **Basic slag and its use in agriculture.** Nature **105**: 183–184. 1920.—A discussion organized by the Faraday Society, held Mar. 23. Slag produced by Bessemer process has a marked effect on pastures, and British agriculturists could use 300,000 to 400,000 tons a year. The open hearth process which is likely to supersede the Bessemer yields two slags, both poorer in phosphates.—*O. A. Stevens.*

1417. Anonymous. **The nitrogen problem.** [Rev. of: Anonymous. **Ministry of munitions of war. Munitions inventions department. Nitrogen products committee. Final report.** *VI + 357 p.* H. M. Stationery office: London, 1919.] Nature **104**: 533–535, 568–570. 1920.—Committee estimates post-war supply of fixed nitrogen potentially available is likely to show an increase of 30 to 40 per cent upon pre-war production, almost wholly due to development of synthetic processes. Demands of war set aside needs of agriculture to the great detriment of the world's food supply, causing almost universal recognition of the vital importance of nitrogenous fertilizers. Under favorable conditions nitrogen fixation and allied processes stand at a very considerable advantage as compared with non-synthetic methods (based on pre-war prices). The committee recommends the establishment of: (1) calcium cyanamide process to yield 60,000 tons per annum, (2) synthetic ammonia (Haber) process up to minimum of 10,000 tons of ammonia per annum, and (3) ammonia oxidation plant, in conjunction with the synthetic ammonia factory, to yield 10,000 tons of 95 per cent nitric acid or its equivalent in nitrates. The investigation of other fixation processes is recommended.—*O. A. Stevens.*

1418. Jenkins, E. H., and E. Monroe Bailey. **Fertilizer report for 1919.** Connecticut (New Haven) Agric. Exp. Sta. Bull. **217**: 53–106. 1919.—Analyses of 339 brands of fertilizers offered for sale in the state are given.—*Henry Dorsey.*

1419. Russell, E. J. **The manufacture of artificial fertilizers.** [Rev. of: Lloyd, Strauss L. **Mining and manufacture of fertilizing material and their relation to soils.** *VI + 153 p.* D. Van Nostrand Co.: New York. Crosby, Lockwood and Son, London. 1919.] Nature **105**: 4–5. 1920.—Reviewer considers the two chapters on pebble phosphate and hard-rock phosphate fairly good. Other chapters contain much that is poorly selected or antiquated.—*O. A. Stevens.*

1420. Thorne, Chas. E. **Basic slag vs. acid phosphate.** Ohio Agric. Exp. Sta. Monthly Bull. **5**: 141–147. 1920.—A comparison of the two materials as a source of phosphorus. Basic slag was found to be a useful carrier of phosphorus, but the claim made that it is superior to acid phosphate is not justified.—*R. C. Thomas.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

SPERMATOPHYTES

1421. Anonymous. **Diagnoses Africanae. LXXIII.** Bull. Misc. Inf. Kew **1920**: 23–29. 1920.—The following new species and varieties are described and new combinations made: *Acmadenia teretifolia* Phillips (*Diosma teretifolia* Link), *A. teretifolia* var. *glabrata* Phillips (*Diosma teretifolia* var. *glabrata* Sond.), *Craterispermum caudatum* Hutchinson, *Senecio Snowdenii* Hutchinson, *Mostuea amabilis* Turrill, *Thunbergia prostrata* Turrill, *Asystasia amoena* Turrill, *Leucadendron uniflorum* Phillips, *Phyllanthus asperulatus* Hutchinson, *P. delagoensis* Hutchinson, and *Isachne angusta* Stapf.—*E. Mead Wilcox.*

1422. Anonymous. **Decades Kewenses. Decas XCV.** Bull. Misc. Inf. Kew **1920**: 66–71. 1920.—The following new species are described: *Stellaria Wallichiana* Haines, *Aspidopterys Hutchinsonii* Haines, *Tetrastigma alcicorne* Haines, *Knoxia linearis* Gamble, *Oldenlandia anamalayana* Gamble, *O. Barberi* Gamble, *Jasminium Parkeri* Dunn, *Pseuderanthemum Dawei* Turrill, *P. ellipticum* Turrill, and *Lasiococca Comberi* Haines.—*E. Mead Wilcox.*

1423. B., E. G. [Rev. of: Jörgensen, E. **Die Euphrasia-Arten Norwegens. (Euphrasia species in Norway.)** Bergens Museums Aarbok 1916–17; Naturvidenskabelig raekke nr. 5. *337 p., 11 maps, 14 pl., 54 fig.* John Griegs: Bergen, 1919.] Jour. Botany **58**: 111–112. 1920. —The various sections of the genus are characterized, and an abbreviated form of the key is reproduced. The monograph is in German with some notes in English.—*K. M. Wiegand.*

1424. Baker, Edmund G., and C. E. Salmon. **Some segregates of Erodium cicutarium L'Herit.** Jour. Botany **58**: 121–127. *Pl. 554.* 1920.—Segregates of *E. cicutarium* fall into two groups—those confined to sand dunes or similar places along the coast, and those growing normally inland. Only the coastal species are treated in this paper. A review of literature is given, followed by a key to the British species. Synonomy, careful descriptions, references to exsiccatae, and detailed notes on distribution are given for the five species treated. The following species are considered. *E. glutinosum* Dumort., *E. dentatum* Dumort., *E. neglectum* sp. nov., *E. Lebelii* Jord., and *E. Ballii* Jord. The plate contains illustrations of *E. neglectum* and *E. Lebelli.*—*K. M. Wiegand.*

1425. Benoist, Raymond. **Liste de plantes récoltées en Guyane française par M. Wachenheim. [List of plants collected in French Guiana by M. Wachenheim.]** Bull. Mus. Hist. Nat. [Paris] **26**: 85–92. 1920.—Besides many species previously known the following are described from this collection as new to science: *Ormosia cinerea* and *Melanoxylon speciosum.*—*E. B. Payson.*

1426. Blake, S. F. **Revision of the true mahoganies (Swietenia).** Jour. Washington [D. C.] Acad. Sci. **10**: 286–297. *2 pl., 2 fig.* 1920.—The taxonomic history of the genus *Swietenia*, dating from the publication in 1743 of Catesby's "Natural History of Carolina," is cited, and the five known species are described, one of these being added as a new species. The most important of these commercially at the present time is probably *S. macrophylla;* this species has largely replaced in commerce *S. Mahogani*, which was much valued earlier. But much of the "mahogany" now on the market is from other genera than *Swietenia*, often, indeed, from widely separated families. Five species are recognized one of which, *S. cirrhata*, is new to science.—*Helen M. Gilkey.*

1427. Britton, N. L. **Two new West Indian plants.** Torreya **20**: 83–84. 1920.—Two new species are described: *Stenophyllus Harrisii* from Jamaica and *Croton Fishlockii* from the Virgin Islands.—*J. C. Nelson.*

1428. Britton, N. L. **The wild pimento of Jamaica.** Jour. New York Bot. Gard. 21: 38, 39. 1920.—*Amomis jamaicensis* Britton & Harris, sp. nov.—*H. A. Gleason.*

1429. Britton, N. L., and C. F. Millspaugh. **The Bahama Flora.** *Roy. 8 vo., viii + 695 p.* Published by the authors: New York, June 26, 1920.—The present work includes plants of the four great phyla of the vegetable kingdom, namely, *Thallophyta*, *Bryophyta*, *Pteridophyta*, and *Spermatophyta*. The treatment of the lower groups has been contributed by prominent specialists, as follows: *Musci* by Mrs. N. L. Britton; *Hepaticae* by Professor Alexander W. Evans; *Lichens* by Professor Lincoln W. Riddle; *Algae* by Dr. Marshall A. Howe and Mr. Frank S. Collins; *Diatoms* by Mr. Charles S. Boyer; *Fungi* by Dr. Fred J. Seaver and Dr. William A. Murrill. Ample keys are provided for both genera and species, which, except in some of the lower groups, are described in detail and accompanied by a limited bibliography and synonymy. A chapter on "Exploration and Collections" is given; also a special chapter on "Bibliography," prepared with the coöperation of Mr. John H. Barnhart, is added. The following is a list of the new genera, species, combinations, etc., of which Britton & Millspaugh are the authors unless otherwise indicated; *Dichromena inaguensis* Britton, *Atamosco cardinalis* Britton (*Zephyranthes cardinalis* C. H. Wright), *Encyclia fucata* (*Epidendrum fucatum* Lindl.), *E. bahamensis* (*Epidendrum bahamense* Griseb.), *E. rufa* (*Epidendrum rufum* Lindl.), *E. diurna* (*Limodorum diurnum* Jacq.), *E. inaguensis* Nash, *E. plicata* (*Epidendrum plicatum* Lindl.), *E. acicularis* (*Epidendrum aciculare* Batem.), **Nidèma** gen. nov., *N. Ottonis* (*Epidendrum Ottonis* Rchb. f.), *Oncidium bahamense* Nash, *O. lucayanum* Nash, *Peperomia spathulifolia* Small, *Dendropemon brevipes* Britton, *D. bahamensis* Britton, *Coccolobis Northropiae* Britton, *Ocotea coraicea* Britton (*Laurus coriacea* Sw.), *Anneslia formosa* (*Acacia formosa* Kunth), *Cracca cathartica* (*Galega cathartica* Moc. & Sesse), *Dolichos insularis* Britton, *Erythroxylon confusum* Britton (*E. affine* A. Rich., not St. Hil.), *Polygala Wilsoni* Small, *Margaritaria bahamensis* (*Phyllanthus bahamensis* Urban), *Croton rosmarinoides* Millsp. (*C. rosmarinifolius* Griseb., not Salisb.), *Curcas Curcas* (*Jatropha Curcas* L.), *Adenorima gymnonota* Millsp. (*Euphorbia gymnonota* Urban), *Abutilon trisulcatum* (*Sida trisulcata* Jacq.), *Malache bahamensis* (*Pavonia bahamensis* Hitchc.), *Zuelania Guidonia* (*Laetia Guidonia* Sw.), *Anamomis lucayana* Britton, *Nymphoides aureum* Britton (*Limnanthemum aureum* Britton), *Neobracea bahamenesis* Britton (*Bracea bahamenesis* Britton), *Jacquemontia cayensis* Britton, *Gerardia bracteosa*, *Guettarda Nashii*, *G. Taylori*, *G. inaguensis*, *Borreria inaguensis* Britton, *B. saxicola* Britton, *V. Wilsonii* Britton, *B. bahamensis* Britton, *B. savannarum* Britton, *Lobelia lucayana*, *Eupatorium lucayanum* Britton, *Eschenbachia lyrata* (*Conyza lyrata* HBK.), **Neothymópsis** gen. nov., *N. thymoides* (*Tetranthus thymoides* Griseb.), *N. Brittonii* (*Thymopsis Brittonii* Greenm.), *Cirsium Smallii* Britton (*C. pinetorum* Small, not Greenm.), *Hymenostomum flavescens* E. G. Britton, *Amblystegium Sipho* E. G. Britton (*Hypnum Sipho* Beauv.), *Verrucaria mamillaris* Riddle, *Porina Wilsonii* Riddle, *P. macrocarpa* Riddle, *P. subfirmula* Riddle, *Microthelia quadriloculata* Riddle, *Anthracothecium subglobosum* Riddle, *Tomasellia exumana* Riddle, *T. macrospora* Riddle, *Trypethelium eluteriae* var. *subsulphureum* Riddle (*Pseudopyrenula eluteriae* subsp. *subsulphurea* Wainio), *Parathelium microcarpum* Riddle, *Campylothelium decolorans* Riddle, *Lithothelium bahamense* Riddle, *Opegrapha isabellina* Riddle, *O. bahamensis* Riddle, *O. columbina* Riddle, *Chiodecton cruentatum* Riddle, *C. Bracei* Riddle, *Ionaspis tropica* Riddle, *Bilimbia aurata* Riddle, *B. molybditis* Riddle (*Biatora molybditis* Tuck.), *Bacida medialis* Riddle (*Lecidia medialis* Tuck.), *Ocellularia subtilis* Riddle (*Thelotrema subtile* Tuck.), *Thelotrema paralbidum* Riddle, *Leptotrema simplex* Riddle (*Thelotrema simplex* Tuck.), *L. bisporum* Riddle (*Thelotrema bisporum* Nyl.), *Caloplaca galactophylla* Riddle (*Placodium galactophyllum* Tuck.), *C. aurantiaca* var. *isidiosella* Riddle (*Lecanora aurantiaca* var. *isidiosella* Crombie), *C. aurantiaca* var. *diffracta* Riddle (*Callopisma aurantiacum* var. *diffractum* Mass.), *Liagora pedicellata* M. A. Howe, *L. mucosa* M. A. Howe, **Grallatoria** M. A. Howe gen. nov., *G. reptans* M. A. Howe, *Gracilaria lacinulata* M. A. Howe (*Fucus lacinulatus* Vahl), *Laurencia nana* M. A. Howe, *Chondria Collinsiana* M. A. Howe, *Amphibia pectinata* M. A. Howe (*Bostrychia Vieillardi pectinata* Kütz), *A. Sertularia* M. A. Howe (*Bostrychia Sertularia* Mont.), *Herposiphonia bipinnata* M. A. Howe, *Dasyopsis Antillarum* M. A.

Howe, *D. spinuligera* M. A. Howe (*Dasya spinuligera* Collins & Herv.), *Spermothamnion speluncarum* M. A. Howe (*Rhodocorton speluncarum* Collins & Hervey), *S. gymnocarpum* M. A. Howe, *Haloplegma Duperreyi spinulosum* M. A. Howe, *Ochtodes secundiramea* M. A. Howe (*Hypnea?secundiramea* Mont.), **Fosliella** M. A. Howe nom. nov., *F. farinosa* (*Melobesia farinosa* Lamour.), *F. Lejolisii* M. A. Howe (*Melobesia Lejolisii* Rosan.), *F. Chamaedoris* M. A. Howe (*Lithophyllum Chamaedoris* Fosl. & Howe), *Hydroclathrus clathratus* M. A. Howe (*Encoelium clathratum* (Bory) Ag.,) *Padina Vickersiae* Hoyt, *Pseudotetraspora Antillarum* M. A. Howe, *Valonia ocellata* M. A. Howe, *Caulerpa paspaloides compressa* M. A. Howe (*C. paspaloides* var. *typica* f. *compressa* Webb. v. Bosse), *Bryobesia cylindrocarpa* M. A. Howe, *Codium intertextum* var. *cribrosum* M. A. Howe, *Aphanocapsa Howei* Collins, *Gloeocapsa bahamensis* Collins, *Entophysalis violacea* Collins, *Phormidium pulvinatum* Collins, *Dimerosporium zonatum* Seaver, *Phyllachora Ateleiae* Seaver, *P. fusicarpa*, *P. Galactiae* Earle, and *Ophiodothis bahamensis* Seaver.—*J. M. Greenman.*

1430. Cockerell, T. D. A. **A new form of Stanleya.** Torreya **20**: 101, 102. 1920.—*Stanleya glauca latifolia*, collected at Edith, Kansas, in May, 1920, is described. This may later prove to be a distinct species.—*J. C. Nelson.*

1431. Cremata, Merlino. **Una excursión botánica a Isla de Pinos.** [**A botanical excursion to the Isle of Pines.**] Revist. Agric. y Trab. **3**: 47–49. *3 fig.* 1920.—A collecting trip was made to the Isle of Pines by the author and Dr. Juan T. Roig. The following new species were collected: *Erythroxylon Roigii* Britton & Wilson and *Torrubia insularis* Standley. Other rare and interesting species were collected.—*F. M. Blodgett.*

1432. Deane, Walter, and M. L. Fernald. **A new albino rasberry.** Rhodora **22**: 112. 1920.—A white-fruited form of *Rubus idaeus* L. var. *canadensis* Richardson, collected on Caribou Mountain, Mason, Maine, is published by the authors as *Rubis idaeus* L., var. *canadensis* Richardson, forma *Warei*. The plant was discovered by R. A. Ware and has amber-white or honey-colored fruit.—*James P. Poole.*

1433. De Wildeman, E. **Notes sur des espèces continentales africaines du genre "Baphia" Afzelius.** [**Notes on the continental African species of the genus Baphia Afz.**] Ann. Sci. Nat. Bot. **X**, **1**: 201–224. 1919.—After an analytic key for the genus, the following new species are described: *Baphia Bergeri*, *B. Claessensi*, *B. Dewevrei*, *B. Gilleti*, *B. Klainei*, *B. longepedicellata*, *B. odorata*, *B. Pierrei*, *B. Solheidi*, *B. Verschuereni*. The description of one new variety of *B. Klainei* var. *patulo-pilosa* is also given.—*J. P. Kelly.*

1434. Engler, A., and P. Graebner. **Ein neues Polygonatum.** [**A new Polygonatum.**] Notizbl. Bot. Gart. Berlin **7**: 54 (398). 1920.—*P. Beyrodtianum* is described from Japan.—*H. A. Gleason.*

1435. Fawcett, William, and Alfred Barton Rendle. **Flora of Jamaica containing descriptions of flowering plants known from the island.** Vol. IV, Part ii. *XV + 369 p., 114 text illustrations.* Printed by order of the trustees of the British Museum (Natural History) London, 1920.—The present volume is continued on the same lines as volume III and includes the families Leguminosae to Callitrichaceae. The following new names, varieties and combinations are herein published: *Crotalaria sagittalis* L. var. *fruticosa* (*C. fruticosa* Mill.), *Indigofera suffruticosa* Mill. forma *obtusifolia*, *Sesbania Sesban* (*Aeschynomene Sesban* L.), *Aeschynomene* biflora (*Cassia biflora* Mill.), *Zornia tetraphylla* (*Myriadenus tetraphyllus* DC.), *Desmodium intortum* (*Hedysaum intortum* Mill.), *D. purpureum* (*Hedysarum purpureum* Mill.), *Vigna peduncularis* (*Phaseolus peduncularis* HBK.), *V. antillana* (*Phaseolus antillanus* Urb.), *Cassai fasciata* (*Chamaecrista fasciata* Britton), *Entada gigas* (*Mimosa gigas* L.), *Albizzia Berteriana* (*Pithecolobium Berterianum* Benth.), *Zygia latifolia* (*Mimosa latifolia* L.), *Enterolobium mangense* (*Mimosa mangensis* Jacq.), *Linum jamaicense* (*Cathartolinum jamaicense* Small) *Picraena antillana* (*Rhus antillana* Eggers), *Bursera Hollickii* (*Terebinthus Hollickii* Britton), *Mescagnia Hiraea* (*Triopteris Hiraea* Gaertn.), *Croton*

laurinus Sw. var. *adenophyllus* *Cadenophyllus* Spreng., *Gymnanthes integra* (*G. glandulosa* Pax, not Muell. Arg.), and *Euphorbia nirurioides* (*Chamaesyce nirurioides* Millsp.).—*J. M. Greenman.*

1436. Fernald, M. L. **Some variations of Cardamine pratensis in America.** Rhodora 22: 11–14. 1920.—In North America there occur the naturalized *Cardamine pratensis* with pink petals; the indigenous white-flowered *C. pratensis* var. *palustris;* the pink-flowered variety *angustifolia* of the Arctic regions which varies from the typical *C. pratensis* in leaf characters as well as its range; and the pink-flowered double-flowered form *C. pratensis* forma *plena*. A discussion of these variations, their history, and their ranges, is followed by a key. The synonomy, bibliography, and distribution of each is given.—*James P. Poole.*

1437. Fernald, M. L. **The northern variety of Ranunculus hispidus.** Rhodora 22: 30–31. 1920.—At the southern border of its range this plant has erect pubescence, but northward the hirsute plant becomes rare and gradually gives way to a commoner variation with pubescence appressed or even almost or quite wanting. From New England and New York this plant with appressed pubescence extends westward to Iowa, and south to the mountains of North Carolina, West Virginia, Missouri, and Kansas; while the typical *R. hispidus* extends well into Georgia and Arkansas. The writer proposes this more northern extreme as *Ranunculus hispidus* Michx. var. *falsus*, n. var., giving the description, distribution, and a list of characteristic specimens. Many of these specimens were distributed as *R. septentrionalis*, a northern species of swamps and meadows with much coarser stems and leaves and with stout and very long repent stolons developing soon after the expansion of the first flowers.—*James P. Poole.*

1438. Fernald, M. L. **Polygala paucifolia Willd., forma vestita, n. f.** Rhodora 22: 32, 1920.—The typical *P. paucifolia* has the leaves green and quite glabrous except for a slight ciliation and sometimes a little pilosity on the midrib. This new form which the writer proposes has the leaves densely pilose with canescent hairs, and is conspicuous when growing on account of its pale foliage. The type specimen is from the northwestern base of Fall Mountain, Walpole, New Hampshire, where it was collected in 1917.—*James P. Poole.*

1439. Fernald. M. L. **The American varieties of Pyrola chlorantha.** Rhodora 22: 49–53. 1920.—The author gives descriptions and bibliographies of the typical *Pyrola chlorantha* and of its varieties occurring in America, with a key and discussions as to the distinguishing differences between them. The varieties are published as new varieties or new combinations in each case. The writer attempts no solution as to their status.—*James P. Poole.*

1440. Fernald, M. L. **Scirpus acutus Muhl.** Rhodora 22: 55–56. 1920.—The writer finds that when, in 1904, Mrs. Chase proposed *Scirpus occidentalis* (Wats.) Chase, as one of four species which had been passing under the aggregate name *S. lacustris* L., she overlooked the clear description given in Bigelow's "Florula Bostoniensis" of *S. acutus*, a new species ascribed by Bigelow to Muhlenberg. Somewhat later Muhlenberg himself published *S. acutus*, contrasting it with his *S. lacustris* (the *S. validus* of Mrs. Chase's treatment). Bigelow's description and Muhlenberg's unquestionably define *S. occidentalis*, and the type station, "deep water at Fresh Pond," is likewise conclusive, for *S. occidentalis* was often collected in Fresh Pond in the days prior to its conversion into a reservoir, but the old collections show no material of *S. validus* from the pond. The writer therefore revives the name *Scirus acutus* Muhl. The bibliography and the synonyms are given.—*James P. Poole.*

1441. Fernald, M. L. **A flora of the Penobscot Bay Region.** [Rev. of: Hill, Albert Frederick. **The vascular flora of the Eastern Penobscot Bay Region, Maine.** Proc. Portland [Maine] Soc. Nat. Hist. 3: 199–304. 1919.] Rhodora 22: 91–96. 1920.—See Bot. Absts. 3, Entry 1810.

1442. Gagnepain, F. **Barringtonia et Decaspermum nouveaux. [New species of Barringtonia and Decaspermum.]** Bull. Mus. His. Nat. [Paris] **26**: 72–74. 1920.—*Barringtonia Eberhardtii*, *B. edaphocarpa*, and *Decaspermum cambodianum* from southeastern Asia are described as new.—*E. B. Payson.*

1443. Gagnepain, F. **Un genre nouveau de Composées, Blumeopsis. [Blumeopsis, a new genus of the Compositae.]** Bull. Mus. Hist. Nat. [Paris] **26**: 75–76. 1920.—**Blumeopsis** is proposed as a genus new to science and to it is assigned one species, *B. flava* (*Blumea flava* DC.), from southeastern Asia.—*E. B. Payson.*

1444. Gamble, J. S. **The Indian species of Mimosa.** Bull. Misc. Inf. Kew **1920**: 1–6. *7 fig.* 1920.—Seven species of *Mimosa* are recognized as occurring in British India. These species are contrasted by means of a key and figures illustrating the characteristics of the leaflets. The following species are described as new to science: *M. himalayana*, *M. Barberi*, *M. Prainiana.*—*E. Mead Wilcox.*

1445. Godfery, M. J. **Epipactis viridiflora Reich.** Jour. Botany **58**: 33–37. *Pl. 553.* 1920.—This is supplementary to a paper in Jour. Botany **57**: 37–42. *E. viridiflora* var. *leptochila* Godfery is contrasted with *E. latifolia* All., which most continental authors consider a mere form or variety. In the first portion of the paper, differences in vegetative organs are considered; and in the second portion differences in reproductive organs are taken up. The root systems of the two are very different. Also the leaf arrangement is different; in *E. viridiflora* it is distichous; while in the other species the leaves are in a six-ranked rosette. Many differences were found in the flowers, most of which are illustrated in the plate. These differences lie in the form of the top of the ovary, the sessile or stalked acute or obtuse anther, and the projection of the pollinia. The rostellum in one species is minute and withered; in the other, large and persistant. The more conservative nature of floral variation is noted; hence the importance of the differences mentioned. The relation of structure to reproduction in *Anacamptis pyramidalis* is taken as an example of the above statement, and outlined. These differences between *E. viridiflora* and *E. latifolia* are correlated with remarkable functional changes. *E. latifolia* is pollinated by wasps, and the pollen is not friable, but is carried as a pollinium. Self-fertilization seems impossible. In *E. viridiflora* var. *leptochila* the viscid gland is reduced and inoperative, and "fertilization" by insects does not occur, or at least is rare. It is shown how the contents of the anther slide down onto the viscid surface of the stigma, producing self-fertilization. In *E. viridiflora* var. *dunensis*, the pollen is very friable even before the flower opens. *E. viridiflora* was originally fertilized by insects, but has lost that function. Müller believed that cross-fertilization in *E. viridiflora* occasionally occurred, due to aphids; but the author thinks this very exceptional. Müller studied the two species most minutely, and said that we have here two form cycles which differ by thoroughly essential characters, and have the same claim to be considered distinct species as any two species of a genus.—*K. M. Wiegand.*

1446. Guillaumin, A. **Contribution à la Flore de la Nouvelle-Calédonie. [Contribution to the Flora of New Caledonia.]** Bull. Mus. Hist. Nat. [Paris] **26**: 77–84. 1920—In continuation of previous similar lists, species belonging to many families are listed, and various collections of them are cited with the collectors' numbers and stations at which they were taken. The following species are described as new: *Utricularia canacorum* Pellegrin and *Litsea ripidion.*—*E. B. Payson.*

1447. Hayata, Bunzō. **Icones Plantarum Formosanarum nec non et contributiones ad floram Formosanam. [Icones of the plants of Formosa, and materials for a flora of the island, based on a study of the collections of the botanical survey of the Government of Formosa.)** Vol. IX. *155 p., 8 pl., 55 fig.*, Bureau of Forestry, Government of Formosa: Taihoku. March 25, 1920.—The present volume continues the results of studies on the formosan flora and includes the families Ranunculaceae to Araceae, arranged in the sequence of Bentham and Hooker. The following new species and varieties are proposed: *Clematis garanbiensis*, *Illicium leucan-*

thum, I. randaiense, Kadsura Matsudai, Eurya leptophylla, E. Matsudai, Camellia theifera (Griff.) Dyer var. *assamica* (Masters) (*Thea chinensis* Hayata, in part, not Sims), *Actinidia gnaphalocarpa, Reevesia formosana, Phellodendron Wilsonii* Hayata & Kanehira, *Euonymus acutorhombifolia, E. batakensis, E. kuraruensis, E. Matsudai, Celastrus patentiflorus, Cassine Matsudai, Crotalaria akoensis, Indigofera mansuensis, I. venulosa* Champ. var. *glauca, Tephrosia ionophlebia, Milletia taiwaniana, Desmodium akoense, D. Shimadai, Uraria formosana* (*Desmodium formosanum* Hayata), *U. yaeyamensis, Glycine pescadrensis, G. subonensis, G. tomentella, Galactia lanceolata, Phaseolus heterophyllus, P. rotundifolius, Vigna acuminata,* **Dolichovigna** new genus of Leguminosae, *D. formosana, D. rhombifolia, Dolichos Lablab* L. var. *dolichocarpa, Albizzia longepedunculata, Spiraea tarokoensis, Filipendula kiraishiensis, Viburnum Matsudai, V. taihasense, V. villosifolium, Lonicera japonica* Thunb. var. *sempervillosa, L. rubropunctata, L. shintenensis, Uncaria formosana* (*Ourouparia formosana* Hayata), *U. uraiensis, Cephalanthus glabrifolius, C. ratoensis, Dentella Matsudai, Hedyotis kuraruensis, Anotis formosana, Mussaenda albiflora, Chomelia gracilipes, C. kotoensis, C. lancifolia, Randia suishaensis, Diplospora* (?) *buisanensis, Ixora graciliflora, Psychotria* (?) *kotoensis, P. macrophylla, Lasianthus hiiranensis, L. microstacthys, L. parvifolius, Paederia uraiensis, P. villosa, Damnacanthus Tashiroi, Rhododendron nankotaisanense, Symplocos kiraishiensis, S. Somai, S. sozanensis, Jasminum Shimadai, Osmanthus bibracteatus, O. daibuensis, O. gamostromus, O. Matsudai, Gardneria hongkongensis, Erycibe acutifolia* (*E. obtusifolia* Hayata, not Benth.), *Ambulia stipitata, Lindernia stellariifolia, L. cruciformis, Mimulus formosana, Bonnaya aristato-serrata, Torenia hokutensis, T. nantoensis, Hygrophila pogonocalyx, Strobilanthes lasiocalyx, S. longespicatus, S. prionophyllus, S. rankanensis, S. Tashiroi, Dicliptera uraiensis, Helicia hainanensis, Elaeagnus buisanensis, E. convexolepidota, E. daibuensis, E. erosifolia, E. grandifolia, E. longidruba, E. nokoensis, E. oiwakensis, E. paucilepidota, Phyllanthus oligospermus, P. takaoensis, Glochidion chademenosocarpum, G. hypoleucum, G. kotonese, G. kusukusense, G. sphaerostigmum, G. suishaense, Antidesma acutisepalum, A. hiiranense, A. rotundisepalum, Acalypha kotoensis, A. longe-acuminata, A. Matsudai, Claoxylon kotoense, Alchornea kelungensis, A. loochooensis* (*A. trewioides* Hayata, not Muell. Arg.), *Euphorbia garanbiensis, E. liukiuensis, E. Tashiroi, Zelkova formosana, Z. tarokoensis, Lithocarpus Nakaii, L. Matsudai, Dendrobium alboviride, Bulbophyllum Somai, Eria Matsudai, Calanthe Takeoi, C. Matsudai, Vanilla ronoensis, Galeola Matsudai, Gastrochilus Matsudai, Orchis kiraishiensis, Alpinia agiokuensis, A. densespicata, A. dolichocephala, A. hokutensis, A. kusshakuensis, A. mediomaculata, A. suishaensis, A. tonrokuensis,* **Pseudosmilax** new genus of Liliaceae, *P. seisuiensis, P. hogoensis, Smilax formosana, S. herbacea* L. var. *daibuensis, S. horridiramula, S. ovato-rotunda, S. taiheiensis, S. takaoensis, S. tenuissima, S. trachyclada, Heterosmilax raishaensis, Polygonatum arisanense, P. officinale* All. var. *formosanum, Smilacina formosana, Paris arisanensis, Metanarthecium formosanum, Aspidistra daibuensis, A. mushaensis, Heloniopsis acutifolia, Arisaema quinquefoliola,* and *A. Matsudai.*—*J. M. Greenman.*

1448. Henry, Augustine, and Margaret G. Flood. **The Douglas firs: a botanical and silvicultural study of the various species of Pseudotsuga.** Proc. Roy. Irish Acad. **B, 35**: 67–90. *Pl. 12–14.* 1920.—See Bot. Absts. 7, Entry 331.

1449. Hitchcock, A. S. **The genera of grasses of the United States with special reference to the economic species.** U. S. Dept. Agric. Bull. 772. *307 p., 20 pl., 174 fig.* Government Printing Office: Washington. 1920.—All genera of grasses are described that embrace native, introduced, or cultivated species in the United States. Under each genus reference is made to the type species and to species of economic importance, both useful and harmful plants. The economic consideration takes into account the grasses that are used for hay or pasture purposes, for cereal and sugar production, those used in broom and paper making, and the ornamental species. Throughout the paper the word "grass" is used strictly in its botanical sense; that is, as applying only to the plants of the family Poaceae or Gramineae. The keys to the tribes and genera are arranged in a simple, workable way; and these, together

with an illuminating half-natural-size photograph or sketch of a representative species under each genus, should enable the amateur botanist readily to fix in his mind the generic characteristics, and, indeed, the species typifying the genus. A brief of the publication of each generic name is given, and the reason is stated for choosing the species taken as a type. The arrangement of the material, in general, differs from that of previous contributions on the subject in that the tribes have been placed in a new sequence, based upon the complicity of the flower structure, the simplest or most primitive being placed first and the most highly developed being given last. According to the author's researches, the tribal arrangement as presented is the closest approximation to the natural relationship that can be shown in sequence. Accordingly, the bamboos (Bamboseae) are listed first, as certain genera embraced in this tribe are of the simplest floral structure. The following points are of special interest to agrostologists: *Munroa* has been placed under the tribe Chlorideae. *Triodia* has been restored; and while the species embraced in this genus are variable in habit and in floral character, the author does not deem it practicable to segregate any of them into distinct genera. *Aira* has been restored and *Deschampsia* relegated to synonomy under it. *Aspris* is used for three annual economically unimportant species heretofore carried under *Aira*. *Agrostis palustris* is the name given for *A. alba*, cultivated redtop. *Agrostis capillaris* replaces what has been considered a variety of cultivated redtop, *A. alba vulgaris*. The synonomy is complete for generic names based on American species. The lifelike sketches of representative species by Mrs. Gill and the detailed taxonomic drawings by Assistant Agrostologist, Mrs. Agnes Chase, practically all of which are new, are exceedingly helpful in the recognition of the species typifying each genus.—*Arthur W. Sampson.*

1450. Hoehne, F. C. **Catalogo do Hervario e das especies cultivadas no Horto "Oswaldo Cruz" com a indicacão daquellas que existem em duplicata e poderão ser cedidas em permuta. [Catalogue of the herbarium and of the species cultivated in the Garden of "Oswaldo Cruz" with an indication of those which exist in duplicate and which may be given in exchange.]** *8 vo., 48 p.* São Paulo, 1919.

1451. Holm, Theo. **Antennaria alpina and A. carpathica.** Rhodora 22: 138–142. 1920.—The author argues that these species should not be excluded from the flora of this continent, but that both species exist in Canada as well as in the United States. He believes that *A. alpina* (L.) R. Br. is polymorphic and is represented on this continent by various forms which have been separated as varieties and even as species, such as *A. glabrata* Greene and *A. mucronata* E. Nelson. Likewise, *A. carpathica* (Wahlenb.) R. Br. is claimed to be represented on this continent by *A. lanata* Greene.—*James P. Poole.*

1452. Holmberg, Otto R. **Einige Puccinellia-Arten und Hybriden. [Some Puccinellia species and hybrids.]** Bot. Notiser [Lund] 1920: 103–111. May, 1920.—Four species and six hybrids are discussed. Several new names or combinations for these are proposed.—*P. A. Rydberg.*

1453. Hutchinson, J. **Clematopsis, a primitive genus of Clematideae.** Bull. Misc. Inf. Kew 1920: 12–22. *5 fig.* 1920.—**Clematopsis** Bojer, previously in manuscript only or applied to species as a *nomen nudum*, is taken up for a group of the *Clematideae* from tropical Africa, South Africa, and Madagascar. Typical *Clematis* species have opposite leaves and sepals that are induplicate-valvate in the bud. A valvate aestivation is considered derived from an imbricate one, at least in the *Ranales*. In *Clematopsis* there is a gradation in aestivation characters from simple imbricate to a type of induplicate-valvate arrangement that approaches closely the condition in *Clematis*. One species of *Clematopsis* produces at times alternate leaves. It is held that the present genus is a primitive one in the tribe and connects that tribe with the *Anemoneae*. The following new combinations are made and new species published: *Clematopsis Kirkii* (*Clematis Kirkii* Oliv.), *C. Teuczii* (*Clematis villosa* var. *Teuczii* O. Ktze), *C. speciosa*, *C. chrysocarpa* (*Clematis chrysocarpa* Welw.), *C. argentea*, *C. katangensis*, *C. Oliveri*, *C. Stuhlmannii* (*Clematis Stuhlmannii* Hieron.), *C. trifida* (*Clematis trifida* Hook.), *C. scabiosifolia* (*Clematis scabiosifolia* DC.), *C. Stanleyi* (*Clematis*

Stanleyi Hook.), *C. oligophylla* (*Clematis oligophylla* Hook.), *C. anethifolia* Bojer (*Clematis anethifolia* Hook.), *C. pimpinellifolia* Bojer (*Clematis pimpinellifolia* Hook.), *C. villosa* (*Clematis villosa* DC.). A key is given to the 15 recognized species, and specimens are cited.—*E. Mead Wilcox.*

1454. Jennings, O. E. **Impatiens pallida forma speciosa f. nov.** Ohio Jour. Sci. **20**: 204. 1920.—A description is given of this new variety of *Impatiens pallida* with pale cream colored flowers. The type specimen was collected in Schenley Park, Pittsburgh, Pennsylvania.—*H. D. Hooker.*

1455. Jumelle, H. **Un Jatropha dioique de Madagascar.** [**A dioecious Jatropha from Madagascar.**] Rev. Gen. Botany **32**: 121–124. 1920.—A description of *Jatropha mahafalensis* the "betatatra" of Madagascar. This species differs from the others of the genus in being dioecious.—*L. W. Sharp.*

1456. Knowlton, C. H., and Walter Deane. **Reports on the Flora of the Boston District —XXXIII.** Rhodora **22**: 123–127. 1920.—A continuation of the report of the Committee on Local Flora of the New England Botanical Club. Reported species and their distribution in the district about Boston, Massachusetts.—*James P. Poole.*

1457. Kops, Jan, F. W. van Eeden, and L. Vuyck. **Flora Batava. Afbeelding en beschrijving der Nederlandsche gewassen.** [**Flora of Holland. Illustrations and descriptions of the plants of Holland.**] Folio. Parts 400–401. *Pl. 1993–2000* [*colored*]. Martinus Nijhoff: 's-Gravenhage, 1920.—The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The vascular plants are: *Solanum triflorum* Nutt. and *Stipa Neesiana* Trin. & Rupr. [See also Bot. Absts. 5, Entry 2347.]—*J. M. Greenman.*

1458. Lacaita, C. C. **Quercus aegilops.** Bull. Misc. Inf. Kew **1920**: 100–105. 1920.—It still remains most probable that *Q. aegilops* L. is to be identified with the Vallonea oak of commerce.—*E. Mead Wilcox.*

1459. Lauterbach, C. **Beiträge zur Flora von Papuasien VII, no. 64. Die Burseraceae Papuasiens.** [**The Burseraceae of Papuasia.**] Bot. Jahrb. **56**: 317–344. *4 fig.* 1920.—The Burseraceae are represented in Papuasia by only the genera *Canarium* and *Santiria*. Few species were formerly known, but the collections of Ledermann have greatly increased the number, until now 21 species of *Canarium* and 12 of *Santiria* are known. Of the species of *Canarium* a few occur elsewhere, occasionally in cultivation, but mostly endemic. They are tall trees, usually inhabiting the lowlands. The limited distribution of species in both genera may be due to the short period in which the seed is viable, a condition common in most oily seeds. The seeds are distributed by animals, rarely or never by streams except when whole trees are swept downstream. The species of *Santiria* are all endemic. Three are low trees. The genus ranges through all altitudes. Keys to the genera and species are given; also notes and synonomy on the various species. The following species, varieties, and forms are proposed as new: *Canarium moluccanum* Bl. var. *palla* and forma *porphyropyrena*, *C. grandistipulatum*, *C. kaniense*, *C. Branderhorstii*, *C. maluense*, *C. pachypodum*, *C. furfuraceum*, *C. aemulans*, *C. Tamborae*, *C. Ledermannii*, *C. Schlechteri*, *C. fulvum*, *C. appendiculatum*, *Santiria Schlechteri*, *S. sepikensis*, *S. maluensis*, *S. Ledermanni*, *S. leeaefolia*, *S. nubigena*, *S. caudata*, *S. triphylla*, *S. lamprocarpa*, and *S. anisandra*.—*K. M. Wiegand.*

1460. Lauterbach, C. **Beiträge zur Flora von Papuasien VII, no. 65. Die Simarubaceen Papuasiens.** [**The Simarubaceae of Papuasia.**] Bot. Jahrb. **56**: 341–344. *1 fig.* 1920.—This family is represented in Papuasia by five genera, each containing a single species. Only two of these are forest species, the other three being strand plants. The distribution of the strand species is aided by the water currents, as the fruits are well adapted for floating. The species are all found in other countries. The genera listed are *Suriana*, *Samadera*, *Brucea*, *Picrasma*, and *Soulamea*. A key to the genera is given; also notes are given on distribution and nomenclature of the species. *Samadera indica* Gaertn. var. *papuana* is described as new.—*K. M. Wiegand.*

1461. Lauterbach, C. **Beiträge zur Flora von Papuasien, VII, no. 66. Die Anacardiaceen Papuasiens. [The Anacardiaceae of Papuasia.]** Bot. Jahrb. 56: 345–373. *5 fig.* 1920.—Twelve genera and 46 species are listed from Papuasia, of which two genera are endemic. Three genera contain cultivated, or at least economic, species. Sixty-two per cent of the species are endemic. Most of the species inhabit the low-lands, especially in the alluvial swamps along the rivers, where they often form an important part of the woody flora. One species, at least, is a myrmecophile. A few species reach the higher mountain summits. A key is provided to the genera and to the species under each genus. The following varieties, species, and combinations are proposed as new: *Buchanania nova-hibernica, B. montana, B. macrocarpa, B. scandens, Mangifera xylocarpa, Skoliostigma defolians, Pentaspadon Moszkowskii, Campnosperma montana, ?Euroschinus Ledermannii, Rhus lenticellosa* Lauterb. var. *monophylla* and var. *pentaphylla, R. caudata, Nothopegiopsis nidificans, Semecarpus myrmecophila, S. nubigena, S. Schlechteri, S. fulvo-villosa,* and *S. bracteata.* The genus *Skoliostigma* is described as new. Synonomy and nomenclatorial references are given, as well as notes on distribution, morphology, and ecology.—*K. M. Wiegand.*

1462. Lewin, L. **Ueber einige Pflanzen aus dem Küstengebiet von Beludschistan. [On some plants from the coastal region of Baluchistan.]** Bot. Jahrb. 56 (Beibl. 123): 31–36. 1920.—A list of 63 plants is given, collected by Messrs. Possmann and Palmer along the coast of Baluchistan, and determined by Paul Hennings and Paul Ascherson. Of these, 38 had not previously been reported from the northern and northwestern portions of that country. The native names are added where known. The narrow strip of sandy country between the mountains and the coast supports a type of semi-desert vegetation quite different from the flora farther inland. Published records of Baluchistan plants are few; two based on Stock's collections are mentioned.—*K. M. Wiegand.*

1463. Lownes, Albert E. **Notes on Pogonia trianthophora.** Rhodora 22: 53–55. *1 fig.* 1920.—This rather rare orchid was first reported in the region about Asquam Lake, New Hampshire, in 1898, from one station. Six stations are now known, scattered over a comparatively small area, and containing between five and six thousand plants. The writer gives a few brief notes as to its manner of growth, method of fertilization, method of propagation, habit of withdrawing moisture from the tubers in time of drought, and habit, which is peculiar for our native orchids, of opening only on clear days and closing during cloudy weather and at night.—*James P. Poole.*

1464. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 9. *239–304 p., pl. 160–163.* William Applegate Gullick: Sydney, 1920.—The present part contains descriptions, synonymy, notes, and illustrations of the following species: *Eucalyptus Torelliana* F. v. M., *E. corymbosa* Smith, *E. intermedia* R. T. Baker, *E. patellaris* F. v. M., *E. celastroides* Turcz., *E. gracilis* F. v. M., *E. transcontinentalis* Maiden, *E. longicornis,* F. v. M., *E. oleosa* F. v. M., *E. Floctoniae* Maiden, *E. virgata* Sieber, *E. oreades* R. T. Baker, *E. obtusiflora* DC., and *E. fraxinoides* Deane & Maiden. *Ibid.* Part 10. *P. 305–343. Pl. 164–167.* March, 1920.—This part continues the series with a like treatment of: *E. terminalis* F. v. M., *E. dichromophloia* F. v. M., *E. pyrophora* Benth., *R. pyrophora* Benth. var. *polycarpa* (*E. polycarpa* F. v. M.), *E. laevopinea* R. T. Baker, *E. ligustrina* DC., *E. stricta* Sieber, and *E. grandis* (Hill) Maiden.—*J. M. Greenman.*

1465. Metcalf, F. P. **Notes on North Dakota plants.** Jour. Washington [D. C.] Acad. Sci. 10: 188–198. 1920.—A list of marsh and aquatic plants of the state, including 18 species not previously reported.—*Helen M. Gilkey.*

1466. Moore, Spencer Le M. **Alabastra Diversa. Part XXXII.** Jour. Botany 58: 44–49. 1920.—(1) *Plantae Congoenses novae vel rariores.* This contribution consists of notes on the Compositae and Acanthaceae of the Congo. Notes are given on five species of Compositae, three of which are new: *Vernonia divulgata, Aspilia congoensis,* and *Crassocephalum longirameum.* Thirteen species of Acanthaceae are listed, three of which are new:

Hygrophila Vanderystii, *Justicia fistulosa*, and *Rhinacanthus minimus*. (2) *Vaupelia* A. Brand. This, a genus of Borraginaceae, was removed by Brand from the Cynoglosseae to the Lithospermeae. The close relationship of *Vaupelia* and *Cystistemon* Balf, f. was also noted by Brand. As now understood *Vaupelia*, ranging from Somaliland to Angola, contains six species. In the "Flora of Tropical Africa" *V. macranthera* was wrongly merged in *Medusa*. A seventh and new species, *V. hispidissima* from Angola, is added in the present paper. It is related to *V. Medusa* Brand.—*K. M. Wiegand.*

1467. Moxley, George L. **A study in Zauschneria.** Southwest Sci. Bull. **1**: 13–29. *Pl. 2–4.* May 5, 1920.—The following species are considered in this paper: *Z. californica* Presl., *Z. microphylla* (Gray), *Z. cana* Greene, *Z. villosa* Greene, *Z. Eastwoodae* Eastwood & Moxley sp. nov, *Z. latifolia* (Hook) Greene, *Z. viscosa* Moxley, *Z. velutina* Eastwood sp. nov., *Z. tomentella* Greene, *Z. Garretti* A. Nelson, *Z. arizonica* Davidson, *Z. Pringlei* Eastwood sp. nov., *Z. elegans* Eastwood sp. nov., *Z. crassifolia* Rydberg, *Z. glandulosa* Moxley, *Z. Hallii* Moxley sp. nov., *Z. pulchella* Moxley sp. nov., *Z. argentea* A. Nelson, and *Z. canescens* Eastwood sp. nov.—*P. A. Munz.*

1468. Nelson, James C. [Rev. of: Hitchcock, A. S. **The Genera of Grasses of the United States with special reference to the economic species.** U. S. Dept. Agric. Bull. 772. *307 p., 20 pl., 174 fig.* Government Printing Office: Washington, 1920.] Torreya **20**: 84–88. 1920.—In several respects this book marks an advance over our previous knowledge. A new sequence of tribes is proposed, by which the bamboos are placed first, as showing the least differentiation in floral structure, followed by the tribes Poatae and Panicatae. The tribes Oryzeae and Nazieae are placed with the Poatae. A new tribe, Zizanieae, is cut off from Oryzeae on the basis of the unisexual spikelets. *Munroa* is placed with the Chlorideae. *Triodia* is restored. The name *Aira* is taken up for *Deschampsia*, and *Aspris* is substituted for *Aira*. *Agrostis alba* L. becomes *A. palustris* Huds., and *A. alba* var. *vulgaris* Thurb. becomes *A. capillaris* L. The synonymy is complete for all generic names based on American species. The reason for selecting the species taken as the type is stated in all cases. Each genus is technically described, and all economic species mentioned. With two exceptions, all the illustrations are new. One new species (*Epicampes patens*) is described, and 14 new combinations are formally made.—*J. C. Nelson.*

1469. Nicolas, G. **Biologie florale de quelques ombellifères Nord-Africanes. [Floral biology of some North African umbellifers.]** Rev. Gén. Bot. **32**: 230–234. 1920.—See Bot. Abstr. 7, Entry 329.

1470. Pammel, L. H., and C. M. King. **A variation in the black walnut,** Proc. Iowa Acad. Sci. **25**: 241–248. *Pl. 3, fig. 43–44.* 1920.—History and description, with figures of tree, bark, leaf, and fruit of a "mutant" walnut (*Jugland nigra*) with pyriform fruits.—*H. S. Conard.*

1471. Pellegrin, François. **Utriculaires nouvelles de l'Indo-Chine (Lentibulariacées). [New Utricularias from Indo-China (Lentibulariaceae).]** Bull. Mus. Hist. Nat. [Paris] **26**: 180–183. 1920.—The following species are described as new to science: *Utricularia delphinioides* Thorel, *U. delphinioides* Thorel var. *minor*, *U. Geoffrayi*, *U. Lilliput*, *U. odorata*, and *U. Pierrei.*—*E. B. Payson.*

1472. Pennell, Francis W. **Scrophulariaceae of the central Rocky Mountain states.** Contrib. U. S. Nation. Herb, **20**: 313–381. 1920.—This paper, the first of a series, discusses the genera *Verbascum*, *Linaria*, *Collinsia*, *Scrophularia*, *Chionophila*, and *Penstemon*, as represented in the central Rocky Mountain region, including Wyoming, Colorado, Utah, and Idaho east of the 113th meridian. It is introduced by a description of the physical features of the area and a list of localities at which specimens have been collected by Dr. Pennell. Full descriptive keys are given in genera of more than one species, and a list of specimens examined is given under each species. The paper is largely taken up with a revision of the

genus *Penstemon* (commonly known as *Pentstemon*) in the area covered, in which 86 species are listed, with 2 additional new species at the end. Keys to the groups and species are given, and the following new names occur: *Penstemon Jonesii*, *P. leptanthus*, *P. auriberbis*, *P. parviflorus*, *P. dolius* Jones, *P. Paysonii*, *P. eriantherus saliens* (Rydb.) Pennell, *P. ophianthus*, *P. parvus*, *P. magnus*, *P. leiophyllus*, *P. laevis*, *P. saxosorum*, *P. uintahensis*, *P. cyaneus*, *P. cyananthus subglaber* (Gray) Pennell, *P. cyananthus longiflorus*, *P. scariosus*, *P. Garrettii*, *P. Caryi*, *P. strictus angustus*, *P. secundiflorus lavendulus*, *P. Osterhoutii*, *P. versicolor*, *P. lentus*, *P. coloradensis Sileri* (Gray) Pennell, *P. procerus pulvereus*, *P. aggregatus*, *P. obtusifolius*, *P. retrorsus* Payson, *P. caespitosus perbrevis*, *P. glabrescens*, *P. abietinus*, *P. Tidestromii*, *P. mensarum*.—*S. F. Blake.*

1473. Piper, Charles V. **A study of Allocarya.** Contrib. U. S. Nation. Herb. 22: 79–113. 1920.—In this study of the genus *Allocarya* Greene, of the family Boraginaceae, 79 species are recognized from North America north of Mexico, of which 48 are described as new. A key to the species is given, and distributed specimens are cited freely. The species are distinguished chiefly by characters drawn from the nutlets. The following are new: *Allocarya hystricula*, *A. acanthocarpa*, *A. oligochaeta*, *A. echinacea*, *A. cristata*, *A. Eastwoodae*, *A. glyptocarpa*, *A. spiculifera*, *A. anaglyptica*, *A. papillata*, *A. distantiflora*, *A. microcarpa*, *A. oricola*, *A. divergens*, *A. asperula*, *A. Wilcoxii*, *A. setulosa*, *A. stipitata micrantha*, *A. Leibergii*, *A. tuberculata*, *A. charaxata*, *A. ambigens*, *A. lonchocarpa*, *A. limicola*, *A. sigillata*, *A. cryocarpa*, *A. gracilis*, *A. laxa*, *A. pratensis*, *A. cervina*, *A. ramosa*, *A. calycosa*, *A. figurata*, *A. vallata*, *A. undulata*, *A. minuta*, *A. scalpta*, *A. reticulata*, *A. areolata*, *A. inornata*, *A. media*, *A. divaricata*, *A. interrasilis*, *A. insculpta*, *A. dispar*, *A. granulata*, *A. conjuncta*, *A. corrugata*, *A. scalpocarpa*.—*S. F. Blake.*

1474. Pittier, H. **The Venezuelan mahogany, a hitherto undescribed species of the genus Swietenia.** Jour. Washington [D. C.] Acad. Sci. 10: 32–34. 1920.—Though the tree has long been known economically, the Venezuelan mahogany has never before been critically studied and is now described as a new species, *Swietenia Candollei*.—*Helen M. Gilkey.*

1475. Poupion, J. **L'Inobulbon munificum Kranzlin.** Rev. Hort. [Paris] 92: 64–66. *Fig. 15–16.* 1920.

1476. Rehder, Alfred. **New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum.** Jour. Arnold Arboretum 2: 42–62. 1920.—The present article deals with Rosaceae. A classification of all the known species of *Malus* is given, and one new section, *Chloromeles* (Decne.), and new subsections are proposed. The following species, varieties, forms, and combinations based on spontaneous material are new: *Aronia arbutifolia* f. *leiocalyx* and *f. macrophylla*, *Photinia villosa* var. *coreana* (Decne.), × *Amelanchier grandiflora* (Zabel) = *A. canadensis* × *laevis* Weigand, *Malus kansuensis* f. *calva*, *M. honanensis*, *M. Komarovii* (Sarg.), *M. coronaria* var. *dasycalyx*, *M. angustifolia* f. *pendula*, *Docynia docynioides* (Schneid.), *Pyrus ussuriensis* var. *hondoensis* (Kikuchi & Nakai) and var. *ovoidea* (Rehd.), *P. Calleryana* var. *Fauriei* (Schneid.). The following new hybrids, forms and combinations are based on garden plants: × *Sorbus arnoldiana*, *Aronia arbutifolia* var. *pumila*, *Amelanchier grandiflora* f. *rubescens*, *Malus baccata* f. *gracilis*, *M. floribunda* var. *brevipes*, *M. coronaria* var. *dasycalyx* f. *Charlottae*, *M. ioensis* f. *plena*, × *M. robusta* and var. *persicifolia*, × *M. sublobata* (Zabel), × *M. purpurea* (Barbier), × *Chaenomeles superba* (Frahm) with several forms, *Pyrus Calleryana* f. *graciliflora* and f *tomentella* and × *P. congesta*. There are also critical notes on other species of some of the genera mentioned above. (See also Bot. Absts. 4, Entries 1758, 1759.)—*Alfred Rehder.*

1477. Rehder, Alfred. **Tetraplasia, a new genus of Rubiaceae.** Jour. Arnold Arboretum. 1: 190–191. 1920.—*Tetraplasia biflora*, new genus and new species, related to *Plectronia* and *Vangueria*, is described; it is endemic to the Liukiu Islands.—*Alfred Rehder.*

1478. Rehder, Alfred. **New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum.** Jour. Arnold Arboretum 1: 191–210. 1920.—The present continuation of this paper deals with Saxifragaceae and Ranunculacae and a few Pinaceae, Taxaceae, and Liliaceae. Besides many horticultural forms the following species, varieties, and combinations are new: *Juniperus squamata* f. *Wilsonii*, *Paeonia suffruticosa* var. *spontanea*, *Clematis paniculata* var. *dioscoreifolia* (Lév. & Vaniot), *Philadelphus rhombifolius* from Japan, *P. subcanus* var. Wilsonii (Koehne), *P. Delavayi* var. *calvescens*, *P. pekinensis* var. *dasycalyx*, *P. laxus* var. *strigosus* (Beadle), *Fendlera linearis* from Mexico, *F. rupicola* var. falcata (Thornber), *Deutzia heterotricha* from Japan, and *D. calycosa* var. *macropetala* from China.—*Alfred Rehder.*

1479. Rendle, A. B. **Poa omeiensis comb. nov.** Jour. Botany 58: 25. 1920.—A new name made necessary by the discovery that *P. gracillima* Rendle is antedated by *P. gracillima* Vasey. The plant in question is a Chinese species.—*K. M. Wiegand.*

1480. Riddelsdell, H. J. **British Rubi, 1900–1920.** Jour. Botany 58: 101–104. 1920.—This is a summary of the changes made in the interpretation of the British Rubi since the publication of Rogers' hand-book. Most of the changes are due to Rogers' work or have have been done under his guidance. About fifty forms are mentioned.—*K. M. Wiegand.*

1481. Riddelsdell, H. J. **Some records, and rose records.** Jour. Botany 58: 113–114. 1920.—Records of the occurrence of *Callitriche*, *Zannichellia*, *Potamogeton*, *Eleocharis*, *Carex*, and various species of Rosa.—*K. M. Wiegand.*

1482. Rock, Joseph F. **The genus Plantago in Hawaii.** Amer. Jour. Botany 7: 195–210. *1 pl.* 1920.—A critical study of *Plantago* in Hawaii. The author recognizes two species, both endemic: *P. princeps*, with eight varieties, and *P. pachyphylla*, with seven varieties. *P. Queleniana* Gaud. is reduced to a variety of *P. princeps*. Two new varieties, *P. princeps* var. *anomala* and *P. pachyphylla* var. *muscicola*, are described, together with four new forms: *P. pachyphylla* var. *mauiensis* forma *montis eeka*, *P. pachyphylla* var. *kauaiensis* forma *robusta*, *P. pachyphylla* var. *kauaiensis* forma *intermedia*, and *P. pachyphylla* var. *rotundifolia* forma *crassicaudex*. Three species of *Plantago* have been introduced into Hawaii.—*E. W. Sinnott.*

1483. Rusby, H. H. **Codes of botanical nomenclature in the United States Pharmacopoeia.** Jour. Amer. Pharm. Assoc. 9: 670–671. 1920.

1484. Salmon, C. E. **Alchemilla acutidens in England.** Jour. Botany 58: 112–113. 1920.

1485. Schellenberg, G. **Ueber einige Arten der Gattung Rourea Aubl. [Several species of the Genus Rourea Aubl.]** Bot. Jahrb. 56: 21–29. 1920.—This genus has been very much misunderstood. The author in a previous contribution, in 1910, has shown that *Rourea* as understood by Aublet is entirely American, and excludes the African *Byrsocarpus* and the Asiatic *Santaloides*. The author's early studies, based mainly on anatomical considerations, were primarily concerned with generic and subgeneric relationships and limitations. The preparation of a monograph for "Das Pflanzenreich" has brought out new information with regard to species, and has led to this paper. Material named *Rourea frutescens* Aubl. by most authors has been *Connarus pubescens* DC., or *Rourea pubescens* Radlk., or in some cases *R. surinamensis* Miq., or even *Cnestidium rufescens* Planch. *R. surinamensis* Miq. also has been misunderstood, and has been confused with *R. revoluta* Planch., and *R. glabra* HBK. *R. oblongifolia* Hook. & Arn. is apparently a synonym of *R. glabra* HBK. Urban's *R. cubensis* and *R. sympetala* are to be referred to *R. glabra*. Of Baker's three varieties of *R. glabra* only one, var. *parviflora*, is really a variety of this species. Grisebach confused also *R. paucifoliolata* Planch. with *R. glabra*. *R. oblongifolia* Hook. & Arn. and *R. glabra* HBK. are synonymous. The author notes that he was previously in error in the statement that the genus *Rourea* is characterized by sclerenchyma cells in the leaves. Only

R. ligulata Bak. possesses these cells. Species of Connaraceae are rarely characterized by a definite anatomical character. Genera and larger groups, however, possess good anatomical characteristics, especially the genus *Pseudoconnarus* Radlk. Several species are noted as being little known to the author. The value of the pubescence on the calyx as a specific character as used by Baker is questioned.—*K. W. Wiegand.*

1486. Schlechter, R. **Eine weitere neue Vanda.** [**Another new Vanda.**] Orchis **14:** 2–4. 1920.—*Vanda luzonica* Loher. is described as new to science.—*E. B. Payson.*

1487. Schlechter, R. **Pelatantheria insectifera Ridl.** Orchis **14:** 7–10. 1920.—The history of this species is discussed at length, and the three known species of the genus are redescribed.—*E. B. Payson.*

1488. Schlechter, R. **Vanda concolor Bl.** Orchis **14:** 21–24. 1920.—A history of this species in literature and a description of the plant are given.—*E. B. Payson.*

1489. Schlechter, R. **Die Gattung Eulophiella Rolfe.** [**The genus Eulophiella Rolfe.**] Orchis **14:** 24–30. 1920.—The known facts concerning this Madagascan genus are here collected, and a key is given to the three recognized species. *E. Perrieri* is described as new to science.—*E. B. Payson.*

1490. Schneider, Camillo. **Notes on American willows. IX.** Jour. Arnold Arboretum **2:** 1–25. 1920.—The present article deals with the section *Discolores* with 4 and the section *Griseae* with 5 species. The synonymy, nomenclature, distribution, and relationship of these 9 species and their varieties are discussed at length and the following 2 new varieties proposed: *Salix Scouleriana* var. *crassijulis* (Anderss.) and *S. petiolaris* var. *rosmarinoides* (Anderss.). (See also Bot. Absts. 3, Entries 1838, 1839; 4, Entries 1769, 1770; 5, Entry 1058.)—*Alfred Rehder.*

1491. Small, J. K. **Cypress and population in Florida.** Jour. New York Bot. Gard. **21:** 81–86. *Pl. 245–247.* 1920.

1492. Smith, J. J. **Plantae novae vel critecae ex Herbario et Horto Bogoriensi I.** [**New or critical plants from the herbarium and garden of Buitenzorg I.**] Bull. Jard. Bot. Buitenzorg, **III, 1:** 390–410. *Pl. 38–56.* June, 1920.—The following new species are described and figured: *Phyllanthus ovatifolius, Glochidion styliferum, Dicoelia affinis, Baccaurea crassifolia, Claoxylon velutinum, Calophyllum grandiflorum, Clethra elongata, Rhododendron Vanvuurenii, R. fortunans, R. lompohense, R. radians, Gaultheria celebica, Diplycosia celebensis, D. gracilipes, Vaccinium bigibbum,* and *V. latissimum.*—*J. J. Smith.*

1493. Surgis, E. **Contribution à l'étude des Frankéniacées.** [**A study of the Frankeniaceae.**] Compt. Rend. Acad. Sci. Paris **170:** 246–249. 1920.—This family is regarded as consisting of the following genera in addition to *Frankenia*: *Beassonia* Roxburgh, *Hypericopsis* Boissier, *Niederleinia* Hieronymus, and *Anthobryum* Philippi. To the last-named genus, which previously has consisted of a single species, is added *Frankenia triandra* Remy on the basis of the number of stamens. *Niederleinia juniperoides* Hieronymus is held to be distinct from *Frankenia microphylla* Cav. A variety, *angustifolia*, is added to *Hypericopsis persica*. A new species, *B. compacta*, is added to the genus *Beassonia.*—*C. H. and W. K. Farr.*

1494. Verdoorn, Inez C. **The Order Primulines (Myrsinaceae, Primulaceae, and Plumbaginaceae), as represented in the Transvaal.** South African Jour. Sci. **16:** 365–735. *9 maps.* 1920. An examination of all the material in the South African herbaria has established the fact that 11 species of the above order occur in the Transvaal.—*E. P. Phillips.*

1495. Weatherby, C. A. **Habenaria psycodes, var. ecalcarata in Vermont.** Rhodora **22:** 31–32. 1920.—A description of a peculiar orchid collected by Dr. Anne E. Perkins in a

meadow at Berkshire, Vermont, and later determined by Professor Ames as a peloric form of *Habenaria psycodes* which was described, figured, and named var. *ecalcarata* by Miss M. M. Bryan in the Ann. Missouri Bot. Gard. 4: 38. 1917. The peculiarities of this form "(for it seems to be a teratological development rather than a true variety)", are an oblong-ovate, spurless petal in place of the usual three-parted, spurred and fringed lip; and the development of four anther sacs set at various angles in a rough semi-circle about its upper part, instead of the usual two nearly erect anther sacs. All of the flowers of the inflorescence were alike.—*James P. Poole.*

1496. Wiegand, K. M. **Variations in Lactuca canadensis.** Rhodora 22: 9–11. 1920.—The writer has attempted a classification of the varieties and forms of *Lactuca canadensis* which seems to accord more with the material found in the field than does the treatment found in our various manuals. In floral and fruit characters *L. canadensis* is remarkably constant, and it is only in the leaves that great fluctuation is found. A short discussion of some of these variations is given, with a summary in the form of a key. Descriptions and bibliographies of the species and the forms recognized by the writer are given.—*James P. Poole.*

1497. Wiegand, K. M. **A new species of Spergularia.** Rhodora 22: 15–16. 1920.—An account of the discovery of an apparent new species of *Spergularia*, which the author proposes as *S. alata* sp. nov. This species was collected at different times from 1916 to 1919 by different collectors, from the brackish soil about salt springs and salt ponds in central New York. A description is given as well as a comparison with the more closely related species. The attention of botanists is called to the plant in the hope that it may be found elsewhere.—*James P. Poole.*

1498. Wilson, E. H. **Four new conifers from Korea.** Jour. Arnold Arboretum 1: 186–190. 1920.—*Abies koreana*, *A. nephrolepis* f. *chlorocarpa* and *Larix dahurica* var. *Principis-Rupprechtii* f. *viridis* are described as new and a full description of *Thuja koraiensis* Nakai given.—*Alfred Rehder.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

Burton E. Livingston, *Editor*
Sam F. Trelease, *Assistant Editor*

1499. Anonymous. **A new kelp shredder catalogue.** Pacific Fisherman 18: 56. 1920.

1500. Anonymous. **Making carbon from kelp.** Pacific Fisherman 18: 64. 1920.—U. S. Government experimental kelp works at Summerland, California, believes that bleaching-carbon is a very valuable kelp product.—*T. C. Frye.*

1501. Anonymous. [Abstract of: Williams, W. C. **Observations on cases of seasonal hay fever diagnosed and treated with pollen extracts.** Military Surgeon 46[2]: 199. 1920.] Jour. Trop. Med. & Hygiene 23: 206–207. 1920.—Report on cutaneous tests for sensitiveness to pollens from various plants. Of the 29 cases tested, 22 were sensitive to pollen from ragweed, and 5 to that from golden rod.—*E. A. Bessey.*

1502. Anonymous. **The organization of scientific work in India.** Nature 105: 565–568. 1920.—Chiefly extracts from government of India's dispatch of June 4, 1919.—*O. A. Stevens.*

1503. Anonymous. **The cost of scientific publications.** Nature 105: 285–286. 1920.—Urges government support for publications of scientific societies.—*O. A. Stevens.*

1504. Anonymous. **Symposium on the microscope.** Nature 104: 545–546. 1920.—Relating to technique, manufacture, and research in metallurgy.—*O. A. Stevens.*

1505. Anonymous. [Rev. of: Laucks, I. F. **Commercial oils: vegetable and animal. With special reference to oriental oils.** *VIII + 138 p.* Jno. Wiley and Sons: New York.

Chapman and Hall: London, 1919.] Nature 105: 132. 1920.—"Intended, not for the oil chemist, but those persons concerned in the oil industry who have no knowledge of chemistry, or at least as applied to oils. . . . . short descriptions of the principal oils and fats met with in commerce . . . . even the expert may peruse this part of the volume with advantage."—*O. A. Stevens.*

1506. Anonymous. **The organization of scientific work in India.** Nature 104: 653–654. 1920.

1507. Anonymous. [Rev. of: Pellett, Frank C. **American honey plants together with those which are of special value to the beekeeper as sources of pollen.** *297 p., 155 illus.* American Bee Journal, Hamilton, Illinois.] Jour. Botany 58: 156–157. 1920.

1508. Bailey, E. M. **Food products and drugs, 1919.—Part II. Diabetic foods.** Connecticut [New Haven] Agric. Exp. Sta. Bull. 220: 261–342. 1920.—A discussion of what constitutes a diabetic food is given together with the analysis of 652 foods. These are analysis for water, ash, nitrogen, protein, fiber, starch, fat and other nitrogen-free extract which is had by difference.—*Henry Dorsey.*

1509. Beythien, A. **Trinkbranntwein aus Brennspiritus.** [Brandy from lamp-alcohol.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel. 39: 148–153. 1920.

1510. Coulter, J. M. **The evolution of botanical research.** Nature 104: 581–585. 1920.—Presidential address at St. Louis meeting of American Association for the Advancement of Science, Dec., 1919. The recent tendencies which seem to indicate future development are: (1) dealing with problems that are fundamental in connection with some important practise, (2) increasing realization that problems are synthetic, and (3) that structures are not static. There is no sharp division between pure and applied science. The investigator needs a broad training in order that he may be able to make use of the work of specialists in the various branches. Co-operation will play an important part; also experimental control in investigational work.—[See also next following Entry, 1511.]—*O. A. Stevens.*

1511. Coulter, J. M. **The evolution of botanical research.** Science 51: 1–8. Jan., 1920.—In this address certain evolutionary tendencies in the science of botany are pointed out. The phase of segregation among botanists has passed. One of the growing tendencies is to attack problems that are fundamental in connection with important practises, as, for example, the problems which underlie agriculture. Another tendency is increasing realization that botanical problems are synthetic. The morphologist, physiologist, ecologist, now realize that the facts possessed by one have a close relation to the successful work of the other. Still another tendency is the growing recognition of the fact that structures are not static. One must learn to distinguish between those structures that are relatively fixed and those that are variables. The conception of rigidity of structures is well illustrated by the early work of cytologists and that dealing with genetics. Experience has begun to enlarge the prospective of workers in these fields. It will be necessary for the successful botanists of the future to have a broader training than heretofore; to coöperate in research; to subject their work to rigid experimental control before conclusions are reached. [See also next preceding Entry, 1510.]—*A. H. Chivers.*

1512. Downes, H. **Herbarium pests.** Jour. Botany 58: 251–252. 1920.—A short account of a solution of naphthaline in petrol as a substitute for perchloride of mercury in poisoning herbarium specimens.—*K. M. Wiegand.*

1513. Frye, T. C. **Notes on useful and harmful mosses.** Bryologist 23: 71. 1920.—Brief notes upon mosses that facilitate early decay of shingled roofs; that exterminate grass in lawns; that are used for packing vegetables.—*E. B. Chamberlain.*

1514. Hardy, G. H., A. B. Rendle, B. D. Jackson, and C. S. Myers. **The cost of scientific publications.** Nature 105: 353–354. 1920.—Four separate communications.

1515. Hartridge, Hamilton. **Microscopic illumination.** Jour. Quekett. Microsc. Club. Ser. 2. Vol. 14: 73–88. *Fig. 1–2.*—The subject is discussed under the following headings, (I) theoretical aspect of microscopic illumination, (II) position of critical illumination, (III) alternative methods of illumination, (IV) experimental comparison between different methods of illumination, (V) relative advantages of different methods, (VI) practical applications.—*Leva B. Walker.*

1516. Herdman, W. A., H. H. Turner, E. B. Knobel, and W. W. Bryant. **The cost of scientific publications.** Nature 105: 326–327. 1920.—Four separate communications.

1517. Herzog, R. O. **Über einige Fragen der Faserstoffschemie. [On a few questions in the chemistry of fibres.]** Naturwissenschaften 8: Heft 34. 673–681. 1920.

1518. Holland, T. H. **The organization of scientific work in India.** Nature 105: 452–453. 1920.—A reply from the president of the Indian industrial commission to opinions expressed in previous numbers of Nature. Refers especially to botanical survey and forest botany.—*O. A. Stevens.*

1519. Holman, R. M. **Contributions of Botany to Military Efficiency.** Proc. Indiana Acad. Sci. 1918: 49–55. 1920.—The author discusses some of the ways in which *Sphagnum*, Pathology and Forestry helped to solve difficult war problems.—*F. C. Anderson.*

1520. Hoxie, Frederick J. **Arrangement of heating pipes an important factor in decay of factory roofs.** Trans. Amer. Soc. Heat and Ventilating Eng. 25: 15–24. *12 fig.* Jan., 1919. —Increasing the amount of heat near a roof may be resorted to instead of increasing the insulation to prevent the loss of heat and the consequent precipitation of moisture. The pipes are commonly placed beneath the windows of the sawteeth with the result that the warm moisture-laden air is circulated against the cooler windows and roof, and water thus precipitated upon the roof. The heating pipes should be placed near the roof to keep the planks warm and dry and prevent air circulation.—*Walter H. Snell.*

1521. Kellog, V. **The United States national research council.** Nature 105: 332–333. 1920.—Brief statement of purpose and organization.—*O. A. Stevens.*

1522. Muir, F. **Makiling [Luzon] as a biological station.** [Rev. of: Muir, F. **The Derbidae of the Philippine Islands.** Philippine Journ. Sci. D, 12: 50–52. 1917.] Philippine Agric. 8: 17–18. 1919.

1523. Nicholson, W. A. **Oenanthe crocata L.** Jour. Botany 58: 201. 1920.—The question whether the juice becomes yellow when exposed to the air is discussed.—*K. M. Wiegand.*

1524. Rogers, Leonard. **Organization of scientific work.** Nature 105: 292. 1920.—An argument against centralized control.—*O. A. Stevens.*

1525. Sauvageau, Camille. **Utilization des algues marines. [Utilization of marine algae.]** Encyclopedie scientifique. *394 p.* O. Doin: Paris, 1920.

1526. Trelease, Sam F., and Forman T. McLean. **Mount Makiling [Luzon] as a station for botanical research.** Philippine Agric. 8: 6–16. *Frontispiece and 5 pl.* 1919.

1527. Trelease, William. **Botanical achievement.** Science 51: 121–131. 1920.—An address by the retiring President of the Botanical Society of America, at St. Louis, Dec. 31, 1919.—*A. H. Chivers.*